APR 9 1945

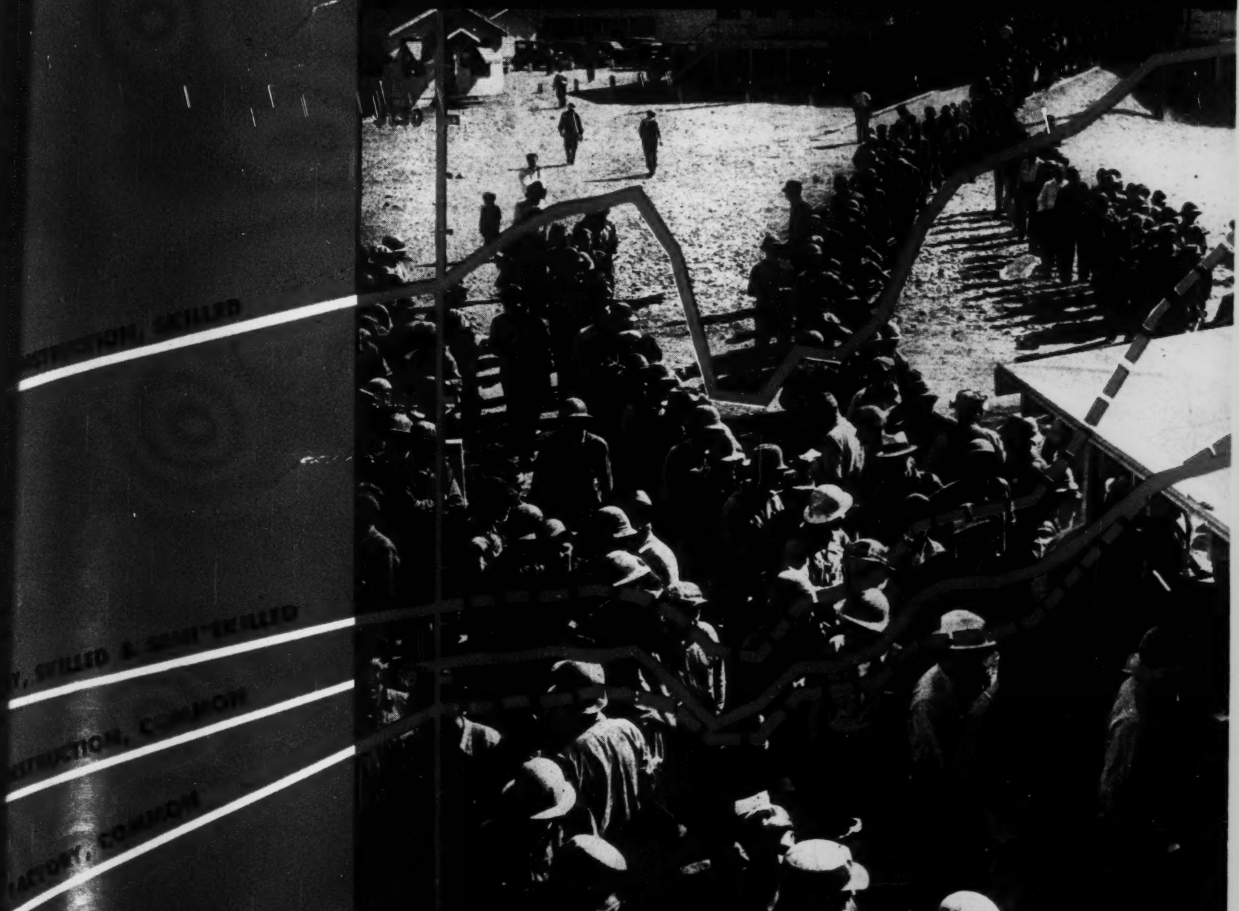
ENGINEERING
NEWS-RECORD

PRIL 5, 1945

THIS ISSUE — PRICE $2.00

Construction Costs Number

WITH LABOR COSTS—BOTH FIELD AND FACTORY—GOING UP...


STRUCTION, SKILLED
Y, SKILLED & SEMI-SKILLED
STRUCTION, COMMON
FACTORY, COMMON

... CAN CONSTRUCTION COSTS BE HELD DOWN?

HERE'S HOW ENGINEERS "Outlawed" PAVEMENT BREAKUPS

**This state's highway subdrainage prog
was speeded and simplified by use of
lengths of sturdy, flexible perforated pipe.
gun in 1940, the work continues, and
dividends in firm, smooth, pavements tha
quire little maintenance.**

★ ★ ★

Until 1940, pavement breakups were as "reg'lar as groundhog day" each spring on certain New England highways. Then state engineers went into action with a thorough subdrainage program. Today that work is paying off in firm, smooth pavements, less maintenance work, reduced costs. A vital factor was—and is—perforated metal pipe that intercepts ground water in the trouble spots. They keep pavement foundations stable and firm.

You can "outlaw" costly breakups the same way with ARMCO Perforated Pipe. Installation is easy and fast, and costs are low—thanks to the long pipe lengths, fewer joints, light weight, and freedom from breakage. Once in the ground,

ARMCO Perforated Pipe has the
ible strength needed to resist tra
weight and impact, vibration a
disjointing. Perforations instead
open joints reduce the hazards
clogging.

Remember that good drainage
costly only when omitted. Write
for literature on Designed Su
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ARMCO

ARMCO Perforated Pipe

NGINEERING NEWS-RECORD

d to Buildings, Sewers, Waterworks, Bridges, Roads, Dams, Foundations, Earthwork, Flood Control, Public Works, Shipbuilding, Irrigation, Canals, Railroads

McGRAW-HILL PUBLISHING COMPANY, INC.

cation Office: 99-129 North Broadway, Albany 1, N. Y. • Editorial and Executive Offices: 330 West 42nd Street, New York 18

JOHN ABBINK, *Publisher*

WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

134 APRIL 5, 1945 No. 14

OMING NEXT

UILDING CODES — Explain the
nderness of South American
ctures, scheduled for the April
ssue, is the second in a series of
cles appearing currently in *ENR*
reinforced concrete design prac-
s in South America by Arthur J.
se, manager, Structural Bureau,
tland Cement Association. In this
cal Mr. Boase critically examines
Brazilian building code in rela-
to U. S. codes and gives us an
ert interpretation of what South
erican engineers have accom-
hed and how their practices might
applied in this country.

rom the European Theater of
erations, Waldo Bowman, editor
NR, will contribute to the April
issue another of his interesting
informative articles on the im-
tant part American engineers are
ing in keeping U. S. armies mov-
forward to the final defeat of
many. In this article he describes
work of the biggest and most
satile Engineer Organization —
dsec" or Advance Section, Com-
nications Zone — in building
road bridges, highways, ports,
eline construction, the rebuilding
wrecked railroads, and other sup-
facilities from the Channel to
Front line.

• Design plans are well advanced,
ht-of-way is being acquired and
tial construction funds have been
ocated to build an 8-lane, $45,-
0,000 Congress Street Expressway
Chicago to relieve badly con-
ted traffic on the city's West Side.
e project will be described in the
pril 19 issue.

OOKING AHEAD

• To carry waste natural gas from
xas to near Pittsburgh a 24-in.
pipeline was built in 10 months.
the first time on a major pipe-
e installation "solid phase" or
ssure oxyacetylene welding was
d extensively for joining the line,
ulting in a reduction in the time,
uipment and manhours required
construction. Unique methods
ed for aerial crossing of rivers
d other important features will be
scribed in an early issue.

• Coming May 3, *ENR's* annual
ter works issue featuring latest
velopments in plant construction,
atment methods.

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Number of copies of this issue printed: 36,638

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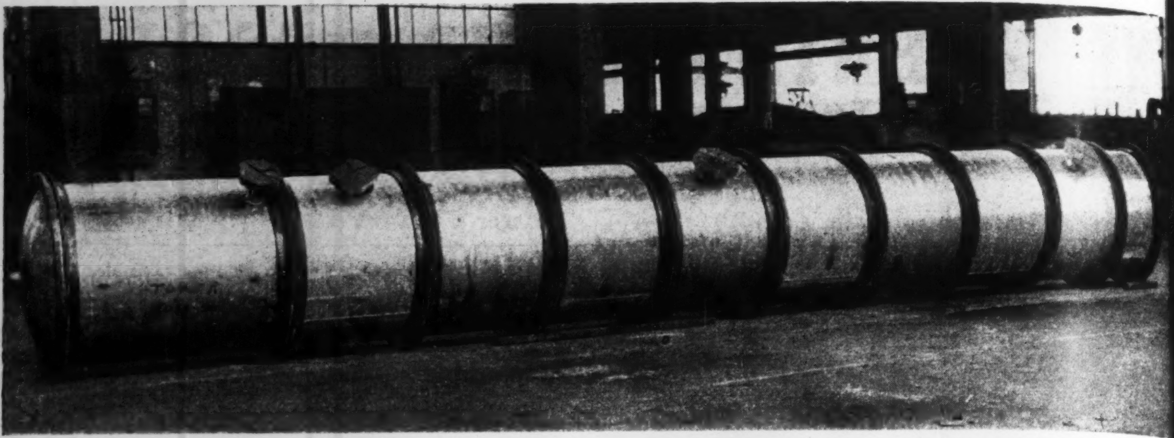
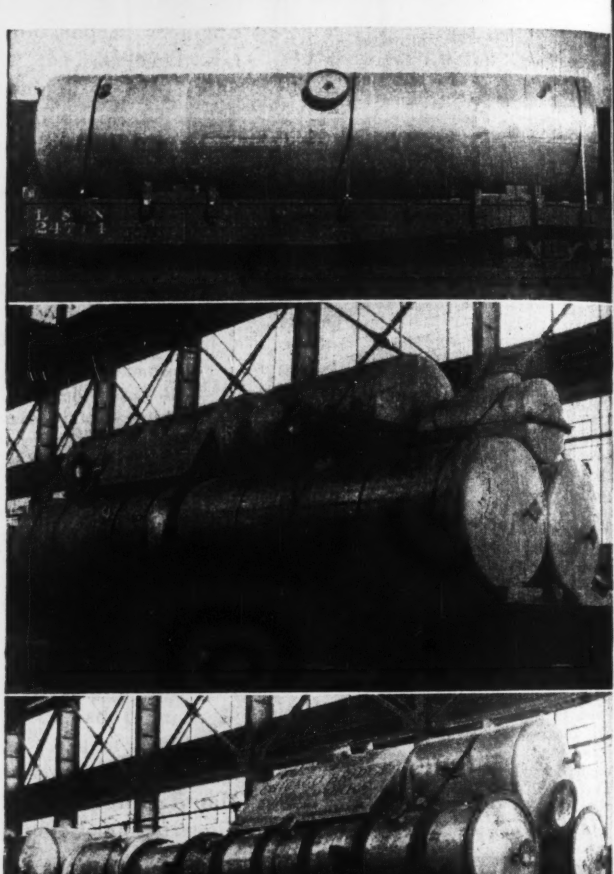


TANKS • • • REFINERY TOWERS • • • PRESSURE VESSELS

fabricated from special metals



Process engineers have made great strides in the past few decades. They have harnessed heat and pressure and chemistry to break liquids and gases into component parts for individual use or to combine several materials into new products with fantastic qualities. Nylon, synthetic rubber and plastics are just a few.

The industrial plant designer has kept abreast with these new processes by building tanks and other equipment of special metals to reduce corrosion, eliminate contamination, operate under excessive temperatures, etc. The storage tanks, drums and towers shown in the accompanying illustrations are typical examples. They are all fabricated from aluminum plates. Welded construction is used throughout, even for attaching steel reinforcing rings on the towers.

Write our nearest office for quotations on tanks and plate work built of steel or special metals.

The 3-ft. 3¾-in. diam. by 27-ft. 4½-in. refinery tower illustrated at the top of this page was fabricated from aluminum plates for a rosin refinery in Mississippi. The ten aluminum vessels of various sizes and the 3-ft. 3¾-in. by 19-ft. 4½-in. stripping tower in the two lower views at the right were made up for the same plant. The upper view in the group at the right shows a tank of welded aluminum construction, 7 ft. 3 in. in diam. by 31 ft. 6 in. long for the Crossett Chemical Company at Crossett, Ark.

CHICAGO BRIDGE & IRON COMPANY

Chicago 4 .... 2101 McCormick Bldg.
New York 6 .... 3311-165 Broadway Bldg.
Cleveland 15 .... 2201 Guildhall Bldg.
Havana .... Edificio Abreu, 402
Philadelphia 3 ...... 1623-1700 Walnut St. Bldg.
Tulsa 3 .... 1617 Hunt Bldg.
Birmingham 1 .... 1520 North Fiftieth Street
Greenville .... York Street
Washington 4 .... 703 Atlantic Bldg.
Houston 1 .... 5609 Clinton Drive
Los Angeles 14 .... 1411 Wm. Fox Bldg.
San Francisco 5 .... 1020 Rialto Bldg.

Plants in BIRMINGHAM, CHICAGO, and GREENVILLE, PENNA. **In Canada—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.**

New Construction in March

ENGINEERING construction volume ntinental United States for March $182,498,000, an average of $36,-00 per week for each of the five s of the month. The weekly average e tops that for the four weeks of uary by 33 percent, and is 4 per- higher than that recorded for the weeks of March 1944.

ivate construction, on the weekly age basis, is 47 percent above a th ago, and 16 percent above the esponding 1944 month.

ublic work records a 28 percent in-se over the preceding month, but is percent lower than in March 1944. e and municipal construction is up percent compared with last month, declines 21 percent compared with year and is the cause of the decrease ublic construction. Federal volume) and 3 percent higher, respectively, a month ago and a year ago.

he March volume brings 1945 con-ction to $380,207,000 for the first rter of the year, a total 16 percent w the $450,122,000 reported for the esponding 1944 period. Private con-ction, $113,444,000, is 15 percent e a year ago, but public work, $266,-,000, is down 24 percent.

ederal construction totals $227,323,- for the three months, a decrease of 29 percent from the preceding year. State and municipal volume, $39,440,-000, is up 17 percent compared with the total for the opening quarter of 1944.

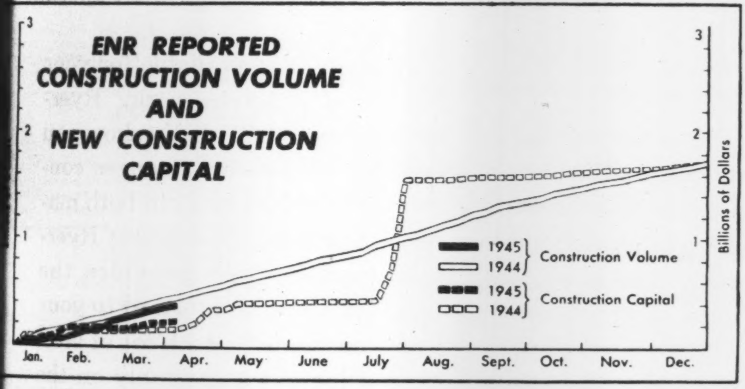
Industrial building volume for 1945 to date is 104 percent greater than in the three-month period last year. Waterworks, sewerage and bridges also report gains of 45, 36 and 242 percent, in that order.

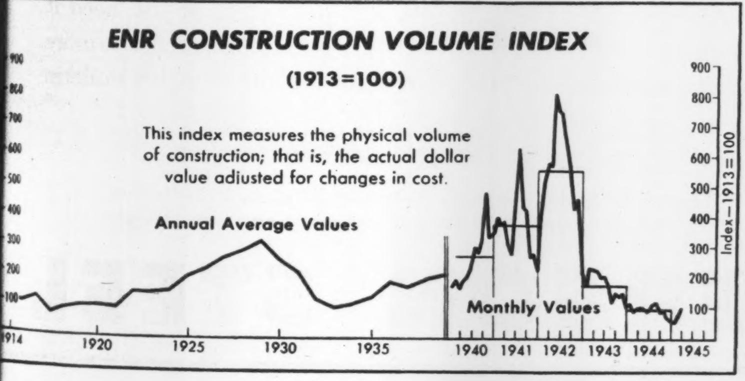
New Capital

New capital for construction purposes for March totals $53,063,000, an increase of 132 percent over the volume reported for the corresponding month last year. Private investment, $39,263,-000, is 88 percent higher than a year ago, and RFC loans for private industrial expansion, $13,800,000, are up 603 percent.

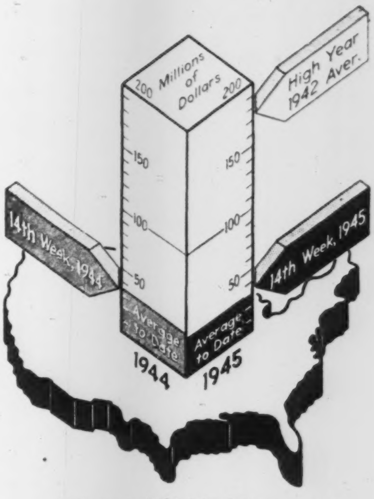
The March new construction financing brings 1945 volume to $249,535,000 for the first quarter, a gain of 37 percent over the $181,638,000 reported for 1944. The total is made up of $37,867,000 in corporate security issues, $120,731,000 in state and municipal bond sales, $13,-800,000 in RFC loans for private industrial expansion, and $77,137,000 in federal appropriations for military and departmental construction.

(*See Volume Table, page 69*)





CONSTRUCTION ACTIVITY



As Reported This Week to...
Engineering News-Record

CONTRACT VOLUME

Continental U. S. Only
(Thousands of Dollars)

	Week of Apr. 5 1945	Cumulative 1945 (14 wk.)	Cumulative 1944 (14 wk.)
Federal	$18,911	$246,234	$341,500
State & Municipal	9,621	49,061	36,399
Total Public ...	$28,532	$295,295	$377,899
Total Private	5,177	118,621	106,186
U. S. Total	**$33,709**	**$413,916**	**$484,085**

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

Type of Work	Dollar Volume (Thousands) This Week	Cumulative 1945 (14 wk.)	Cumulative 1944 (14 wk.)
Waterworks	$277	$9,545	$6,956
Sewerage	359	8,582	6,500
Bridges	129	7,757	2,605
Highways	8,723	30,298	28,259
Earthwork, Waterways	1,204	9,712	18,638
Buildings, Public ..	12,671	180,067	200,248
Industrial	4,096	85,523	41,875
Commercial	639	21,979	54,048
Unclassified	5,611	60,453	124,956

NOTE: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1945 (14 wk.)	Cumulative 1944 (14 wk.)
NON-FEDERAL	$181,228	$93,405
Corporate Securities.	41,867	53,176
State and Municipal.	125,061	32,689
RFC Loans	14,300	7,540
FEDERAL	$77,137	$90,832
Total Capital	**$258,365**	**$184,237**

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost..	Apr. '45	306.43	147.30
Building Cost......	Apr. '45	238.46	128.90
Volume	Mar. '45	103	45

Model of the Princeton Park Homes, Chicago, largest privately financed Negro home project in the country. Approximately 900 tons of Hi-BOND bars used. Architects: Holsman, Holsman & Klekamp.

Hi-BOND RE-BARS

Specified for the Princeton Project

Shipped quickly from nearby Ryerson stocks

With the wholehearted approval of the FHA engineers, Inland Hi-BOND bars were specified by Holsman, Holsman & Klekamp, Architects, for the reinforced concrete work in the Princeton Park Homes Project.

It is interesting that the name Hi-BOND was written into the Specifications at the insistence of the Architects, who, through independent research on various types of reinforcing bars,*proved to their own satisfaction the overwhelming superiority of the Hi-BOND bar. On pull tests with Hi-BOND imbedded in concrete, no measurable slippage occurs until after the yield point of the bar has been exceeded. Hi-BOND bars may be used without hooks in most instances. A saving you can't afford to overlook.

Hi-BOND is available for your reinforced concrete work. Ryerson engineers will gladly show you how to use lighter, stronger construction with savings in both material and time. Convenient Ryerson Steel-Service provides the right bars, cut and formed to your exact needs, with each lot of steel tagged for quick assembly on the job, and delivered as you need it.

Hi-BOND Re-Bars cost no more. Write for our informative bulletin.

*Tests conducted by Prof. Kurt Wendt and Prof. George W. Washa of the Department of Mechanics, University of Wisconsin.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.

RYERSON STEEL

PRIL CONSTRUCTION BUSINESS REPORT

ENR CONSTRUCTION VOLUME AND NEW PRODUCTIVE CAPITAL

(,000 omitted)	March 1944 (5 wk.)	March 1945 (5 wk.)	% Change	Three Months 1944 (13 wk.)	Three Months 1945 (13 wk.)	% Change
al U. S. Construction	$175,726	$182,498	+4.0	$450,122	$380,207	−16.0
ate Construction	45,109	52,508	+16.0	98,340	113,444	+15.0
lic Construction	130,617	129,990	−0.5	351,782	266,763	−24.0
eral	111,974	115,207	+3.0	318,147	227,323	−29.0
al New Productive Capital	$22,837	$53,063	+132.0	$181,638	$249,535	+37.0
ate Investment	20,872	39,263	+88.0	83,266	158,598	+90.0
eral (non-federal work)	1,965	13,800	+603.0	7,540	13,800	+83.0
eral (federal work)	....	....	....	90,832	77,137	−15.0
R Construction Volume Index, 913 = 100	103	103	0	101*	81*	−20.0

Three-month average.

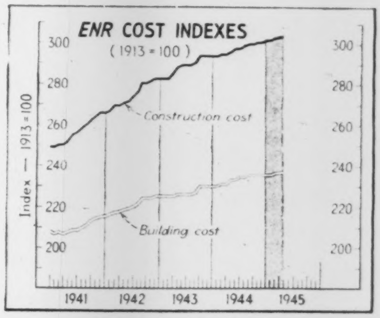
ONSTRUCTION COSTS . . . . WAGE RATES . . . . MATERIAL PRICES

	April 1944	April 1945	% Change	Change March to April 1944 Mar.	1944 Apr.	%	1945 Mar.	1945 Apr.	%
R Construction Cost Index, 1913 = 100‡	297.70	306.43	+2.9	295.34	297.70	+0.8	304.50	306.43	+0.6
R Building Cost Index, 913 = 100‡	234.50	238.46	+1.5	232.32	234.50	+0.9	237.85	238.46	+0.3

‡ *Does not reflect increased costs due to overtime, lower labor efficiency, delivery delays, etc.*

ENR 20-CITIES AVERAGE

	April 1944	April 1945	% Change	1944 Mar.	1944 Apr.	%	1945 Mar.	1945 Apr.	%
mmon Labor	$0.874	$0.904	+3.2	$0.870	$0.874	+0.5	$0.895	$0.904	+1.0
illed Labor (Av. 3 trades)	1.632	1.650	+1.1	1.623	1.632	+0.6	1.643	1.650	+0.4
icklayers	1.726	1.747	+1.2	1.715	1.726	+0.6	1.744	1.747	+0.2
uctural Ironworkers	1.688	1.704	+0.9	1.680	1.688	+0.5	1.698	1.704	+0.4
rpenters	1.481	1.498	+1.1	1.473	1.481	+0.5	1.487	1.498	+0.7
ment, per bbl	$2.62	$2.74	+4.6	$2.62	$2.62	0	$2.74	$2.74	0
inforcing steel, cwt	2.79	2.79	0	2.79	2.79	0	2.79	2.79	0
uctural steel, base	2.10	2.10	0	2.10	2.10	0	2.10	2.10	0
nd, per ton	1.23	1.25	+1.6	1.23	1.23	0	1.25	1.25	0
mber, 2x4 Fir, per M ft.	53.99	55.57	+2.9	53.45	53.99	+1.0	55.32	55.57	+0.5
mber, 2x4 Pine, per M ft.	52.20	53.44	+2.4	49.88	52.20	+4.7	53.44	53.44	0
mmon brick, per M	16.20	18.29	+12.9	16.20	16.20	0	18.32	18.29	−0.2
ady-mixed concrete, c. y.	7.39	7.57	+2.4	7.42	7.39	−0.4	7.57	7.57	0
uct. clay tile, 3x12x12	79.34	84.67	+6.7	79.34	79.34	0	83.73	84.67	+1.1
ving asphalt, cars, ton	15.25	15.48	+1.5	15.25	15.25	0	15.48	15.48	0



ENR INDEX NUMBERS

Base = 100	Construction Cost 1913	Construction Cost 1926	Building Cost 1913	Building Cost 1926	Volume '13	Volume '26
Apr., 1945	306.43	147.30	238.46	128.90	...	...
Mar., 1945	304.50	146.37	237.85	128.57	103	45
Feb., 1945	303.70	145.99	237.71	128.50	78	34
Jan., 1945	302.50	145.41	236.51	127.85	63	28
Dec., 1944	302.30	145.32	236.51	127.85	66	29
Nov., 1944	301.09	144.73	236.10	127.63	74	33
Oct., 1944	301.06	144.72	236.00	127.57	91	40
Sept., 1944	300.46	144.43	236.00	127.57	85	37
Aug., 1944	300.42	144.41	236.09	127.62	121	53
July, 1944	299.94	144.18	235.55	127.33	114	50
June, 1944	298.72	143.59	235.33	127.21	91	40
May, 1944	298.00	143.25	234.80	126.93	100	44
Apr., 1944	297.70	143.10	234.50	126.76	106	46
Mar., 1944	295.34	141.97	232.32	125.59	103	45
1944 (Av.)	298.64	143.59	234.73	126.89	96	42
1943 (Av.)	289.95	139.38	228.75	123.66	176	77
1942 (Av.)	276.31	132.82	222.39	120.22	553	243
1941 (Av.)	257.84	123.95	211.46	114.32	375	164

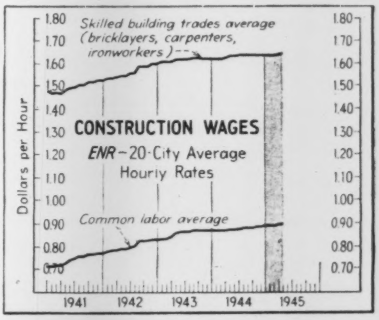
MATERIAL SHIPMENTS . . . . . BUILDING PERMITS

	March 1944	March 1945	% Change	Feb. 1945	% Change Feb.-Mar.
el (% operating capacity) A. I. S. I.	99.0	96.0	−3.0	92.6	+3.7

	February 1944	February 1945	% Change	Two Months 1944	Two Months 1945	% Change
ricated structural steel, tons, A. I. S. C.	42,938	36,283	−15.3	78,101	79,767	+2.2
nent, thous. bbl., U. S. B. of M.	5,055	4,574	−9.5	10,102	9,447	−6.5
lding Permits, 215 cities, Dun & Bradtreet (,000 omitted)	$40,240	$73,599	+82.8	$74,183	$118,366	+59.7

COST OF LIVING INDEX . . . . EMPLOYMENT

	February 1944	February 1945	% Change	Jan. 1945	% Change Jan.-Feb.
t of Living Index, N. I. C. B.	103.4	105.5	+2.0	105.7	−0.2
t (Housing) Index, N. I. C. B.	90.8	91.0	+0.2	91.0	0
al Employment (est.) thous., B. L. S.	38,840	38,559	−0.7	37,997	+1.5
str. Employment (est.) thous., B. L. S.	715	559	−21.8	563	−0.7

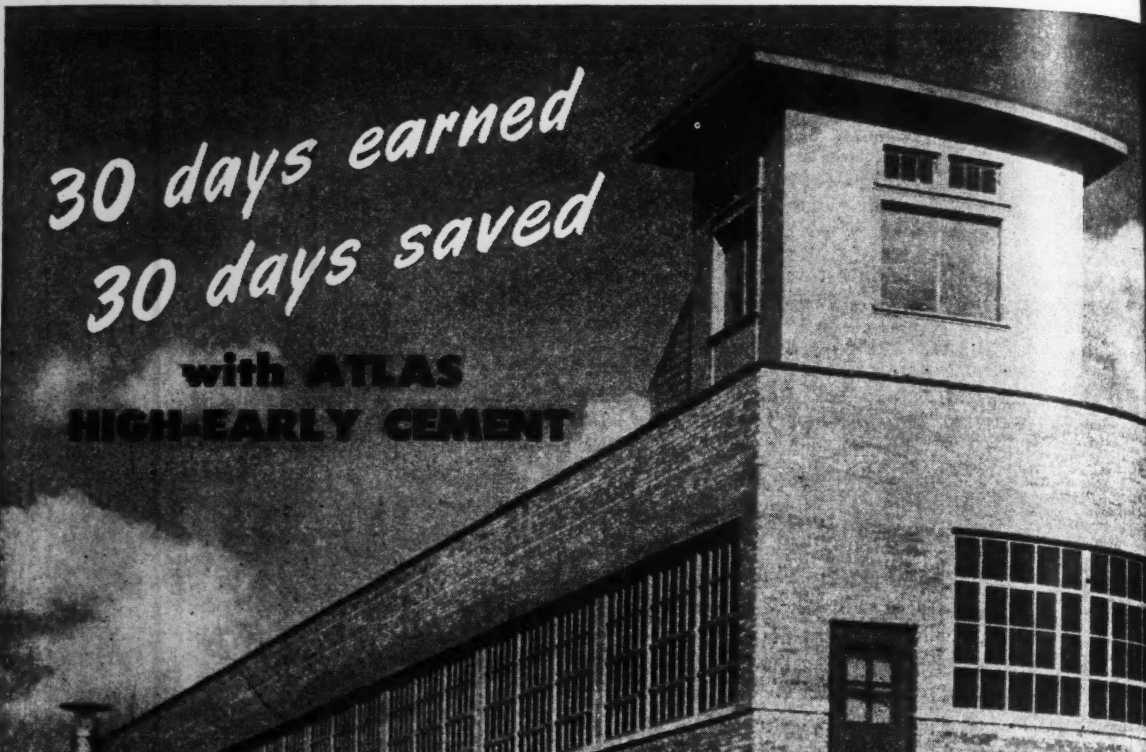


ENGINEERING CONSTRUCTION CONTRACTS — ENGINEERING NEWS-RECORD — MARCH, 1945

ineering News-Record *reports continental U. S. Construction projects of the following minimum costs—waterworks, excavation, drainage andi rrigation,* $15,000 *other public works,* $25,000; *industrial buildings,* $40,000; *other buildings,* $150,000

Five weeks—Thousands of Dollars (000 Omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States March 1945	United States Three Months 1945	United States Three Months 1944	Canada
lic Works										
Waterworks	123	62	1,365	272	860	397	3,079	9,268	6,403	45
Sewerage	308	271	44	257	337	733	1,950	8,223	6,029	40
Bridges, public	33	606	457	306	61	336	1,799	5,128	1,360	....
Earthwork and waterways	48	184	199	16	372	3,998	4,817	8,508	14,646	....
Streets and roads	205	1,625	5,426	408	2,847	1,007	11,518	21,575	26,314	1,111
Buildings, public	2,463	17,527	22,000	11,653	22,433	13,983	90,059	167,396	188,279	2,574
Unclassified, public	811	702	2,992	1,486	4,402	6,375	16,768	46,665	108,751	565
l public	**3,991**	**20,977**	**32,483**	**14,398**	**31,312**	**26,829**	**129,990**	**266,763**	**351,782**	**4,335**
Federal government (included in above classifications)	3,200	18,245	26,690	13,330	28,940	24,802	115,207	227,323	318,147	....
ate										
Bridges, private	....	....	....	....	....	....	....	2,500	870	....
Industrial buildings	3,584	4,313	1,121	1,516	28,478	2,831	41,843	81,427	39,979	8,207
Commercial buildings	375	....	....	1,152	1,132	5,051	7,710	21,340	49,473	....
Unclassified, private	165	243	800	....	960	787	2,955	8,177	8,018	....
l private	**4,124**	**4,556**	**1,921**	**2,668**	**30,570**	**8,669**	**52,508**	**113,444**	**98,340**	**8,207**
l Engineering Construction:										
ch, 1945—5 weeks	**8,115**	**25,533**	**34,404**	**17,066**	**61,882**	**35,498**	**182,498**	....	....	**12,542**
uary, 1945—4 weeks	1,167	19,787	23,934	13,623	24,497	26,508	109,516	....	....	2,619
ch, 1944—5 weeks	3,371	16,309	38,854	22,342	25,256	69,594	175,726	....	....	12,592
e Months—1945	**12,180**	**55,226**	**72,926**	**40,864**	**109,812**	**89,199**	....	**380,207**	....	**20,248**
e Months—1944	12,397	66,819	71,894	49,091	72,468	177,453	....	....	450,122	17,142



A working month instead of a waiting month

The Galvin Manufacturing Corporation of Chicago needed an addition to its plant for war production. The plans called for a three-story structure of reinforced concrete frame. With Atlas High-Early cement, the job was accomplished in freezing weather and completed in 90 days. Had regular portland cement been used, it would have required 120 days.

In winter especially, Atlas High-Early saves fuel, tarpaulins and salamanders, permits earlier use of concrete; conserves manpower, lumber, time; reduces overhead.

For further details, write to Universal Atlas Cement Company, Chrysler Building, New York 17, N. Y.

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EARLY
UNIVERSAL ATLAS CEMENT COMPANY

Save Time with

ATLAS HIGH-EARLY CEMENT

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ENR-H-71

ADDITION TO THE GALVIN MANUFACTURING CORPORATION PLANT, CHICAGO. Victor L. Charn, Architect; Ragnar Benson, Inc., General Contractor, Chicago.

The Week In Engineering and Construction

GINEERING NEWS-RECORD • APRIL 5, 1945 • VOLUME 134 • NUMBER 14

Private work controls to end before that on public work

War Mobilization Director Byrnes recommends that control be kept on public work to prevent a stampede to start construction of such projects when the war in Europe ends

When Germany is defeated and par- l reconversion to civilian construction comes possible, government controls uld be lifted in a manner to favor vate work, particularly privately fi- nced projects, according to James F. rnes, Director of War Mobilization d Reconversion, in his second report the President and Congress. Mr. rnes believes, however, that federal- d should be made available for the anning of public works construction state and local governments in order provide a backlog of work to elimin- e any serious unemployment that ight develop in the first few postwar ars.

Expansion of construction

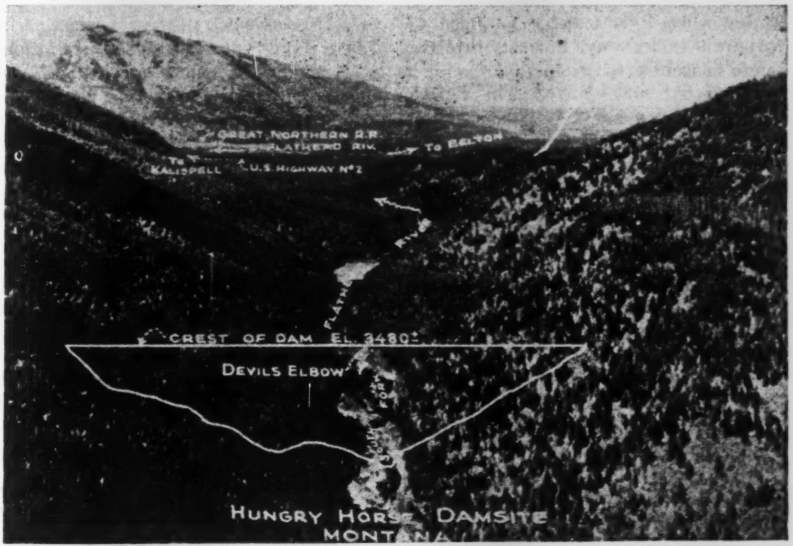
Director Byrnes recommended that as first step toward reconversion the con- ruction industry should get organized accommodate a large volume of work, us giving it an opportunity to play an portant part in postwar economy. his program is expected to require ex- nsive activity and to be time-consum- g, as today there are only 600,000 orkers employed on construction work compared to 2,200,000 in 1941. More- er, the federal government's proposal at 60,000,000 jobs should be available fter the war is expected to result in me 3,000,000 people, including off- e-site workers, being employed on onstruction operations.

The second important phase of the onstruction industry's reconversion, as en by Director Byrnes, is that of re- oval of government controls on build- g equipment and materials. Because of e critical condition of lumber and me other building supplies, a general elaxation of controls will not be pos- ible immediately after VE-Day, he re- ports. Nevertheless, much work will be llowed to start.

On this point Mr. Byrnes said: "Some onstruction may be permitted to go ahead, particularly projects such as the reconversion of industrial facilities, public utilities, rail improvements, highway improvements, and schools, which contribute either to the support of the war against Japan or to our civilian economy. First consideration should be given to deferred maintenance and repairs. Limitations on the construction of private housing will be removed as soon as lumber becomes available." It is assumed that major reconstruction is the type of work meant by "deferred maintenance and repair," as much normal maintenance is now permitted.

Mr. Byrnes continued: "One thing is clear. We should not be stampeded into large public-works programs. State and local governments now have increased revenues. The temptation to start such programs will be great, particularly in those areas where there is temporary local unemployment. Nevertheless, public-works projects should not be undertaken to provide jobs while the war with Japan lasts. The starting of such proj-

(Continued on next page.)



Bureau of Reclamation photo

Preliminary work started on Hungry Horse Dam

The Bureau of Reclamation has begun preconstruction work on the multiple-purpose Hungry Horse Dam on the south fork of the Flathead River in northwestern Montana, according to Paul A. Jones, project engineer. This work will bring plans and specifications to the point where bids can be called promptly after the close of the war. The proposed site of the project is shown above.

Included in the work are: construction of a 4-mile access road, foundation explorations, surveys for the dam and reservoir, selection of sites for a permanent construction camp, survey for a power line, location of suitable aggregates, and additional geological investigations necessary to complete dam designs.

Preliminary studies indicate the dam will be from 450 to 500 ft. high and will contain from two to three million cubic yards of concrete.

The dam will be a key unit in a comprehensive, long-range program to insure full utilization of the Columbia River and tributaries for maximum agricultural and industrial development of the Pacific Northwest. It will provide 1,500,000 acre-ft. of usable storage, power development of the site, an increase in the firm output of downstream plants, flood control and improvement of navigation.

ects could easily interfere with production and with the rapid reconversion of war plants to civilian production."

Director Byrnes also reported on the activity of a special committee established on Feb. 17 to study and analyze plans for private and federal construction. Maj. Gen. Philip B. Fleming, Administrator of the Federal Works Agency, is the key member of the committee, but the War Department, National Housing Agency, War Production Board, Department of the Interior, and numerous other bodies are represented. The studies of this committee revealed about $4.5 billion of authorized federal projects that could be placed under way rapidly and an estimated $2.5 billion backlog of non-federal public works, including housing.

Funds for planning

Despite this backlog, Mr. Byrnes recommended as follows: "While a comprehensive federal works program should be deferred until Japan is defeated, sufficient funds should be made available now to the construction agencies to permit the preparation of detailed plans and specifications to avoid delay when it is feasible to place the program under way. Projects involving state consent or participation should be worked out now. * * * The Federal Works Agency has asked the Congress for funds for interim financing of advance public-works planning by state and local governments. Its request of $75,000,000 was reduced to $5,000,000 in the House of Representatives. It has been increased in the Senate to $35,000,000. I hope that this increase will be approved, as the advance of these funds will stimulate this important phase of postwar planning."

Spot authorization of materials

In discussing how the release of building supplies as well as other materials now critical may be carried out, the report stated: "The War Production Board will use a "streamlined" spot-authorization procedure during the difficult early months (after the defeat of Germany) to increase production of needed civilian goods where labor and materials are available without hampering the continuing military effort. The WPB proposes to discontinue the Controlled Materials Plan as quickly as it is no longer needed to protect military and essential civilian production. It should be possible to substitute a simple priorities plan for the Controlled Materials Plan in the quarter following VE-Day, with CMP orders on the mills, in effect, continuing for an additional quarter. During this transition period, the WPB proposes to "open-end" CMP and permit mills to accept unrated orders which do not interfere with the delivery of rated orders. Similarly, other rating plans will be eliminated, but not immediately. Under this simplified priorities system direct military production would be adequately protected."

Availability of building materials will be dependent largely upon the release of a large manpower force to operations closely connected to the construction industry and to the cutback of war orders.

Rhine Bridge Repairs

Efforts of the Army Engineers to save the bridge over the Rhine at Remagen will be described in the next issue by Waldo G. Bowman, editor, *Engineering News-Record.* Mr. Bowman's description will be illustrated with pictures of the damaged members taken when he visited the structure while it was being repaired.

This report will supplement Mr. Bowman's earlier account of how the bridgehead was made secure, which was published in the March 29 issue.

The report also reveals that some large cutbacks and major changes in plans have occurred. These include: cancellation of contracts for building 142 Liberty ships and 40 tankers, a reduction in the proposed construction program to produce high-octane gasoline, cancellation of plans to build 72 naval vessels, and a $12.8 billion reduction in the War Department's military procurement program. However, since 45 percent of the total productive output of the U. S. in 1944 was for war, high government officials point out that many major cutbacks will be necessary before a large increased volume of construction will be possible.

• • •

Divers seal joints of submerged sewer pipe

Greek sponge divers from Tarpon Springs, Fla., are being used at St. Petersburg to aid in the laying of a 240-ft. extension to the outlet pipe of the city sewage disposal plant.

The job of laying the 30-in. cast iron pipe is being handled by Lee Sheffield, local contractor, with the assistance of Paul Jorgensen, city engineer, and Raymond Ridgley, director of public works.

Four lengths of pipe will be joined into one unit on a barge and then will be rolled over the side of the barge to be connected with the end of the submerged pipe by a diver.

Surplus machinery sale at Richmond April 10

An "on-the-spot-sale" of several h dred pieces of road construction farm machinery will be held by Treasury's Office of Surplus Prop at the Richmond, Va., Army Ser Forces depot, on April 9, 10, and with actual selling starting on April at 1 P.M. The equipment is now loca at 19 camps and depots in North Ca lina, Virginia, and the District of Colu bia. It may be inspected at the foll ing locations from April 2 through Ap 10; Fort Bragg, Camp Sutton, Frankl Camp Davis, Camp McKall, Mario N. C.; warehouse 205, 2D and Virgi Ave., S.W., Washington, D. C.; A.S. depot, Richmond, Va.; Swift Cre Kiptopke, Army Air Field, Norfo Marion Base depot, Norfolk, Ft. Belvo Yorktown, Front Royal, Great Brid Camp Patrick Henry, Staunton, a Camp Pickett, Va.

Further information may be obtaine from R. G. Wilfong, Treasury Depar ment, Office of Surplus Property, 4 Pennsylvania Ave., N.W., Washingto D. C.; John E. Broaddus, District Pro erty Officer, Treasury Department, 20 N. 5th Street, Richmond, Va.; or Joh F. Gonella, District Property Office Treasury Department, Post Office Bo 1429, Raleigh, N. C.

Previous sales were held at Kearne Neb., Tulsa and McAlester, Okla., an Denison, Austin, Bastrop and San An tonio, Texas.

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Chinese engineers to learn railroading

First contingent of 110 Chinese na tionals, all graduate engineers and former employees of Chinese railroads arrived in the United States at a West Coast port recently to begin training in railroad construction and operation. To be assigned to twelve American railroads, they will participate in a training plan inaugurated by Chinese and American officials and sponsored by the two governments which will defray costs of paying the men and their expenses.

The Chinese will work through various ranks in phases of railroading selected by them, and will be advanced gradually until they will be utilizing technical knowledge gained at their universities. Training programs are expected to take from one to two years and provide the Chinese engineers with practical knowledge of railroad construction and operations.

China has a tentative program calling for construction of 50,000 miles of additional railroad after the war.

N. Y. bus lines now have union terminal plans

Officials of interstate bus lines enter- New York City were presented at eeting on March 12 with the Port New York Authority's proposed ns and location for a $13 million ion terminal for all bus lines operat- to and from the present congested dtown area of Manhattan. Repre- tatives of 28 of the 30 bus lines in long and short-haul classifications ended the meeting. Of these, 13 ned pledges to cooperate, 9 signified llingness to support the project, and are presenting the matter to their rectors.

The proposed $13 million structure uld occupy the entire 200x800-ft. ock bounded by Eighth and Ninth enues between W. 40th and W. 41st reets. Planned on a generous scale allow ample room for expansion, the ilding will consist of a low portion on e Ninth Ave. end and a high office uilding on the easterly end of the lock.

Connected by overhead ramps with e Lincoln Tunnel, which handles 75 ercent of all buses entering and leav- g Manhattan, the union bus terminal ould replace the eight individual ter- inals now scattered from 34th St. to 1st St. and east as far as Sixth Ave.

The location of the terminal only a lock and a half from Times Square will enable bus passengers to reach ll important business, amusement and hopping centers with only a short walk under cover to subways and surface transportation.

The terminal layout calls for a ground floor level containing loading platforms for long-distance buses, and n upper level for short-haul suburban buses. This upper level will be reached by overhead ramp from the Lincoln Tunnel plazas and nearby streets, and will accommodate 60 buses at a time at island platforms of the straight pull-through type. Between the two bus levels is a concourse level for distribution of passengers both for local and long-distance lines. This concourse level will also accommodate ticket offices, waiting rooms, restaurants and other auxiliary facilities.

While construction is not expected to start before the spring of 1946, depending on war conditions and agreement of the bus companies, the terminal could be in operation by the middle of 1947, according to Port Authority officials.

Plans for the union bus terminal were drawn by the Port Authority's engineering department under the supervision of J. C. Evans, chief engineer, and Walter P. McQuade, architect.

U. S. engineer to direct German civil affairs

Major General Lucius D. Clay, an engineer officer who for some months past has been serving as deputy to James F. Byrnes, Director of War Mobilization and Conversion, has been appointed to the staff of General Dwight D. Eisenhower to serve as his deputy in charge of civil affairs in Germany when General Eisenhower assumes supreme command there.

Under plans developed at the Yalta Conference, the control of occupied Germany is to be handled by a commission made up of the supreme commanders of the Allied Forces in Europe. The President's announcement concerning General Clay was the first indication that General Eisenhower would head the commission.

Maj. Gen. Lucius D. Clay

General Clay was born in Marietta, Ga., in 1897 and was graduated from West Point in 1918. Most of the next ten years was spent as an instructor in various military schools. From 1929 to 1931 he was in Panama in command of two companies of the 11th Engineers on topographic work. From June, 1933, to June, 1937, he was executive officer of the Rivers & Harbors Section in the Office of the Chief of Engineers, Washington.

After a year spent as consultant to the Philippine Government on hydraulic resources, Capt. Clay was sent to Denison, Tex., as area engineer in charge of flood-control work. In October, 1940, he was appointed secretary to the Airport Approval Board and assistant to the Administrator of Civil Aeronautics. In March, 1942, he was named deputy chief of staff of the Army Service Forces, later becoming assistant chief of staff for materials.

Gen. Farrell praises Ledo Road engineers

For every ton of supplies shipped into the China Theater, the tonnage cost is 1.9 tons by air and 2.25 tons by road, via the longest overland communication line in any theater of war. This insight into the difficulties of supplying China was given by Brig. Gen. T. F. Farrell, Corps of Engineers Construction Service, S O S, India-Burma Theater, in a talk before members and guests of the New York Building Congress on March 28, in which he made laudatory remarks about the Ledo Road Engineers.

"The Ledo Road is our proof," he said, "that the job hasn't been found that can lick American engineers and American construction equipment!"

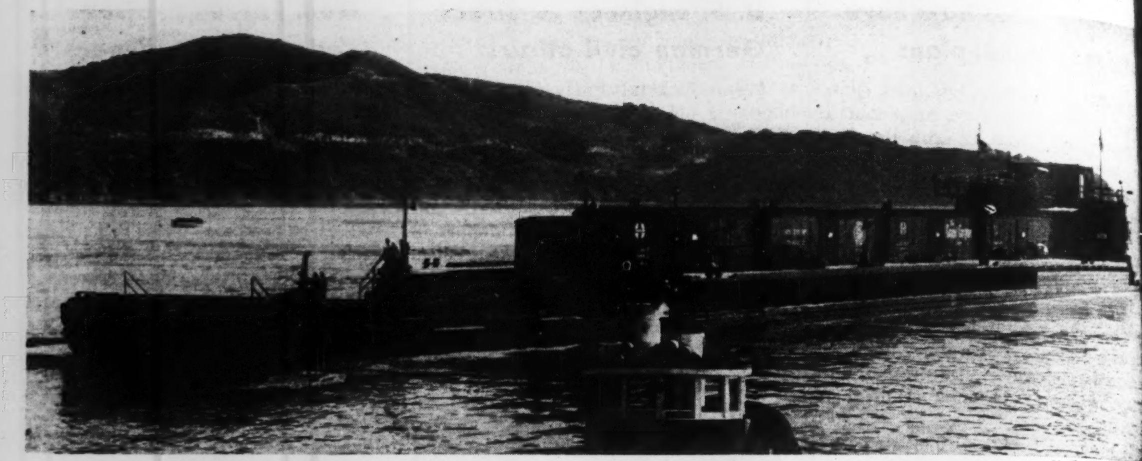
Some of the data given by Gen. Farrell indicate the magnitude of the task. In round figures Gen. Lewis A. Pick's engineers have moved to date a total of 13,500,000 cu. yd. of earth in grading the Ledo and have hauled from streambeds a total of 1,383,000 cu. yd. of gravel for preliminary surfacing.

"Our target dates for future work," Gen. Farrell announced, "call for improvement of the road from Myitkyina to Wanting to all-weather standards by May 15, 1945. On the Burma Road we expect to improve the Kunming to Wanting section to all-weather standards by July 1, 1945."

He estimated the maximum capacity of the old Burma Road prior to its loss to the Japanese at 18,000 tons per month, of air transports to China at present at 40,000 tons per month, and of the reopened Burma Road, with considerable engineering improvement coupled with American management of the transport system, at 60,000 tons per month. Improvements required involve bridge strengthening, reduction of grades from 17 percent to 10 percent or less, widening of narrow shoulders and elimination of the sharpest curves.

Gen. Farrell also praised the builders of the pipelines. The nexus of river, rail, air transport and truck routes linking Indian ports with China has been joined by a system of pipelines. From the tank terminal near Calcutta, the longest invasion-type pipeline ever built by military forces extends 750 mi. to Tinsukia and includes an 8,200-ft. submarine crossing of the Brahmaputra River. Construction is well under way on a second 6-in. line extending from the coast to Assam.

The construction of the pipelines and the Ledo-Burma Road were under the direction of Gen. Farrell, as well as the construction of B-29 bases in India and the operation of ports and railway systems. He is now engaged on special missions throughout the United States.



U. S. Navy phot

Self propelled wharf and car-float made from seabee pontoons

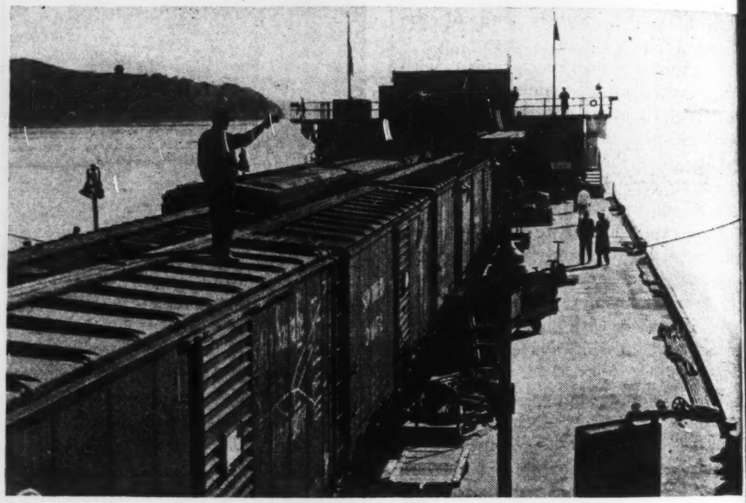
Floating wharves, in the form of self-propelled car-floats, are now employed in San Francisco Bay by the U. S. Navy for the safe handling of explosives and other dangerous freight between land bases and ships anchored off shore.

First of their kind, the combined wharves and car floats are loaded with eight freight cars at conventional rail connections. Six "sea mules", which are essentially outboard motors on a large scale, propel the car-floats out to an anchorage where a cargo ship is waiting.

Loading platforms on each side of the float extend almost the length of the vessel, thus affording all the facilities of standard type wharves for stevedoring operations. The floats are 300 ft. long and 65 ft. wide, and are manned by a crew of 23 men. Living quarters and galley are at the stern of the vessel.

The floats are constructed from the famed 5x7x5-ft. pontoon units developed by the Bureau of Yards and Docks, the same type units that have been extensively used in the war area for improvised wharves and bridges.

Design for the assembly was prepared by the Bay Engineering Co., and construction work was performed by the Walter W. Johnson Co., under the direction of Capt. William W. Schneider, Twelfth Naval Distric Public Works officer. The floating wharv were built in the shallow drydocks of P-cific Bridge Co., in the Oakland estuary.



Maine housing units for England and France

The Federal Public Housing Authority, Boston, Mass., regional office, has announced plans to dismantle three war housing projects at South Portland, Me., and ship all units abroad for use in England and France.

John A. Dobbs of the Boston office says that the projects are: Mountain View, totaling 1,122 rooms and built at a cost of $1,885,000; Cushing Village with 929 units (400 occupied) and built at a cost of $1,000,000; and Long Creek Terrace, 1,880 rooms, cost $1,160,107.

Through the Foreign Economic Administration and lend-lease, prefabricated housing units are also being produced in the U. S. for England and France. (*ENR* Feb. 8, vol. p. 156).

New construction work at Sault Ste. Marie

Col. Allison Miller, district engineer, Detroit District Engineer Office, Corps of Engineers, has announced that plans have just been completed for two new construction projects at the American Locks at Sault Ste. Marie, Mich.

The first project will consist of the removal of Old Brady Pier and the construction of a new sheetpile, cellular type pier capped with concrete. Plans call for a mooring basin, a new masonry boathouse and a small amount of dredging, all of which work is to be included under this contract.

The second project consists of 1,200 ft. of timber cribbing with concrete superstructure, which is to be known as an extension to the southwest pier.

West Coast shipyards converted to repairs

Involving all West Coast shipyards, a Navy conversion program from ship construction to repair is being expanded and has already affected ten shipbuilding concerns it is announced.

At the same time the Navy revealed that Pacific Coast yards are being further opened for repair work by the transfer of $300,000,000 in shipbuilding contracts to Atlantic Coast yards.

Five yards in the San Francisco Bay area which have converted to repair work are Bethlehem Steel Co., Hurley Marine Works, Kaiser's Richmond Yard No. 3, Moore Drydock Co., and United Engineering Co. Soon to be included are Western Pipe & Steel Co. and General Engineering and Drydock Co.

Floods causing damage in Arkansas region

leavy rains in central, southern and tern Arkansas as of April 1 were expected to affect the state's ncipal rivers, Weather Bureau offi- ls said and they reported flood dan- s had lessened during the day as the ılt of all rivers falling. However, pite such optimistic report, flood nage increased in central and south- Arkansas with heaviest rains at lorado with more than five inches seventeen hours and at Conway with r two inches in twelve hours.

Train service from Little Rock to nsas City, Mo., has been inter- pted twice in recent weeks. It was lted again on March 31 when 168 of roadbed fell into the Arkansas ver. Previous washouts were repaired ickly but several days will be re- ired this time and rains of April 1 ay further delay repairs.

Passenger service into Texas is ham- ered.

A day-long downpour adding to sur- ce water standing behind levees on e St. Francis River in Cross County s expected to result in flooding the stern end of Cross County the first of is week.

The State Highway Department lists 3 roads closed, most of them in north- st and southwest Arkansas.

Flood dangers in the eastern part of e country has largely passed.

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MacLeay president, N. Y. structural engineers

Francis R. MacLeay, chief engineer f Corbetta Construction Co., was lected **president f the Structural Engineers Society f New York last** week. **At the** ame time **Geo. E. Strehan,** of **Rob- ert W. Briggs As- sociates, and** Sid- ney **Frieman, con- sulting engineer,** were **made** vice presidents; Matthew Hiller and Louis D'Antona, both New York consultants, were re-elected secretary and treasurer respectively.

Membership in the Structural Engineers' Society is limited to structural consultants who have maintained their own practice for a minimum of ten years. Members now are working with the officials of New York City on building code revisions.

Shoemaker heads OPA's Machinery Price Branch

Walter Shoemaker, head of the Construction and Extraction Equipment Sections, Machinery Price Branch, Office of Price Administration, has been made acting price executive of the Machinery Price Branch of the OPA. He succeeds William F. Kelly who has resigned to head a company handling war veteran loans.

A graduate of Lehigh University, Mr. Shoemaker spent six years with the Tennessee Valley Authority on construction equipment purchase, maintenance and cost prior to joining OPA in 1941. Prior to work with TVA he was with Bartlett Hayward Co. of Baltimore.

Work started on plans for Palisades Dam, Idaho

Preliminary work in the preparation of plans for the proposed $31,500,000 Palisades Dam in Idaho has been started by the U. S. Bureau of Reclamation under the supervision of Donald I. Jerman, construction engineer, at Idaho Falls. The work, estimated to take one year, will include additional exploration of the dam site to determine foundation conditions and the laying out of new routes for 55 miles of roads which must be relocated to remove them from the area to be flooded.

The dam will be constructed of earth and rock, 2,040 ft. long at the crest, form a 21-mile-long reservoir which will flood 16,400 acres in Idaho and Wyoming and store 1,424,000 acre-ft. of water.

Construction is planned to begin in the immediate postwar period, having been authorized by Congress.

JOBS OF THE WEEK

BREAKWATER, Alameda, Calif.

Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded a contract for the construction of a breakwater at the Naval Air Station to Basalt Rock Co., Inc., Napa, Calif., at $1,094,338.

FIBER CONTAINER PRODUCTION PLANT, Pine Bluff, Ark.

U. S. Engineers, Little Rock, Ark., awarded a contract for a fiber container production plant to Ditmars-Dickmann Construction Co., Muskegee, Okla. The estimated cost is $1,200,000.

ORDNANCE PLANT, McAlester, Okla.

Bureau of Yards & Docks, Navy Department, Washington, D. C., received the lowest bid for an ordnance plant addition from J. A. Tereling, Boise, Idaho. The estimated cost is $7,300,430. DeLeuw Cather & Co., Chicago, Ill., is the engineer.

ORDNANCE PLANT ADDITIONS, Flora, Miss.

U. S. Engineers, Mobile, Ala., awarded a contract for the construction of additional facilities at Mississippi Ordnance Plant to M. T. Reed Construction Co., Belzoni, Miss., at $1,000,000.

CONVALESCENT HOSPITAL, Camp Edwards, Mass.

C. J. Maney Co., Inc., Somerville, Mass., awarded a contract for constructing a convalescent hospital by U. S. Engineers, Boston, Mass., at $1,449,977.

FOUNDRY BUILDINGS, Bettendorf, Ia.

U. S. Engineers, Omaha, Neb., awarded a contract for expanding foundry buildings at Ordnance Steel Foundry Co., to Fegles Construction Co., Minneapolis, Minn. The estimated cost is $1,000,000, total with equipment, $2,500,000. Giffels & Vallet, Inc., Detroit, are the engineers and architects.

DYNAMOMETER TEST BUILDING, Toledo, O.

Packard Motor Co., Toledo, awarded a contract for constructing 1- and 2-story, 78x182 ft. brick, concrete dynamometer test building and 1-story, brick, concrete, 79x125 ft. research laboratory, to Christman Co., Lansing, Mich. The estimated cost with equipment is $1,350,000.

AVIATION STOREHOUSE, San Diego, Calif.

Bureau of Yards & Docks, Navy Department, Washington, D. C., has awarded a contract for an aviation storehouse addition to N. H. Golden, San Diego, Calif. at $3,219,470.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 333.

OBITUARY

Joseph F. McBeth, 82, retired topographical engineer with the U. S. Coast & Geodetic Survey, died March 26 in Washington, D. C. Mr. McBeth, who studied at Purdue University before going to Washington in 1905, retired from government service 14 years ago.

Staff Sgt. Wm. C. Braden and **Private Clyde Braden,** sons of Frank I. Braden, and partners in the Braden Construction Co., Hastings, Neb., were recently both killed in action in Europe the same week. They were in the First and Third Armies, respectively.

Harry Allen Sullivan, 57, superintendent of steel erection for the American Construction Co. at Houston, Tex., died in that city on March 14.

John Henry Frederickson, 77, former city engineer of Oklahoma City, Okla., and builder of state capitols at Boise City, Idaho, Salt Lake City, Utah, and Oklahoma City, died in the latter city March 21. He was graduated in civil engineering from the University of Illinois in 1891. Other important work included engineering projects for a number of railroads and construction work on the World's Columbian Exposition, Chicago, 1893, and the Louisiana Purchase Exposition, St. Louis, 1904.

Capt. Jerry Ray McDonald, 21, surveyor and civil engineer of McGregor, Tex., was killed over Germany, Feb. 28 while serving as a pilot of a P-51 Mustang fighter plane. He was educated at the University of Texas.

William E. Davis former county engineer at Tulsa, Okla., and civil engineer in that locality for 30 years, died March 14.

Amos A. Meador, a civil engineer with the Texas State Board of Water Engineers at Austin died here March 12.

William F. Covil, 40, senior hydraulic engineer of the Boston Metropolitan District Water Supply Commission, died at Boston on March 23. He was a civil engineering graduate of Tufts College, 1926.

John M. Weber, 75, Massillon, Ohio, who formerly for 15 years was superintendent of roads and bridges in Stark County, died March 24. He had been associated with the Vogt Construction Co.

Nils P. Severin, 83, veteran building contractor of Chicago, died March 26 in Evanston, Ill. As head of the firm bearing his name, he remodeled the White House, removing timbers that had been damaged by the British in the War of 1812, and later built the Arlington Memorial Bridge, Washington, D. C.

Augustus Hoke Nicholls, Tuscaloosa, Ala., civil engineer, connected with the Gulf, Mobile & Ohio Railroad for many years, died March 23.

Edward J. Clark, 59, chief engineer at the city waterworks, Grand Rapids, Mich., where he had been employed for 26 years, died March 19.

Chas. A. Cobb, 78, formerly employed as a construction superintendent by the George A. Fuller Co. and the Thompson Starrett Co., New York building firms, died in Jersey City, N. J., March 31.

Pfc. Thomas B. Beck, 32, a former builder, and, before entering the U. S. Army, connected with the St. Johns River Shipbuilding Co., Jacksonville, Fla., and with the Jacksonville District U. S. Engineer Office for 18 months, was killed in action on Iwo Jima on Feb. 19.

James Gilbert Farie, 46, designing engineer for the Tampa Shipbuilding Co., died March 26 at Plant City, Fla.

James R. Crocker, 69, who served 18 months in France with the Engineer Corps in World War I, died in Kansas City, Mo., March 29. He was manager of the Kansas City office of the Permutit Co. of New York.

Edward G. Wright, 51, former assistant superintendent of the Erie division of the New York Central R. R., died at Erie, Pa., on March 28. He was a civil engineer graduate of Syracuse University in 1915.

Sydney Arnold Lake, 61, chief engineer, Dominion Construction Co., Vancouver, B. C., died in Vancouver on March 17. Educated in England, Mr. Lake went to Canada in 1900. He served as an officer in the 6th Field Co., R.C.E., and had charge of camp construction in British Columbia during the last war.

The Week In Engineering and Construction

(*Continued on page* 220)

Army Engineers may op
Morganza Floodway

If the lower Mississippi continue
rise, the U. S. Army Engineers will
the Morganza Floodway in about a w
to avoid extreme highwater at New
leans, Maj. Gen. Eugene Reybold's
fice announced Tuesday of this w
Plans to permit part of the flow of
river to discharge through this divers
channel are now being complet
Should this operation prove necess
it will be the first time the floodway
been put in service.

Morganza Floodway, which was c
pleted prior to the war except for so
of the elevated highway and railro
crossings, starts above the town of M
ganza, La., some 160 river miles ab
New Orleans and extends southwestw
to the Atchafalaya River floodw
which leads to Grand Lake and then
into the Gulf of Mexico.

Use of the floodway, which was
signed for a capacity of over 500,0
cfs., will require detouring of traffic
lines of both the Texas & Pacific a
Louisiana & Arkansas railroads over t
elevated line of the Missouri Pacif
Traffic over the Southern Pacific w
not be interrupted. It may be possib
to keep State Highway 190 in servi
by some temporary construction in t
east section of the area to be floode
Raising this road has not been co
pleted. State Route 30 will need to
closed.

The Army Engineers also reveal th
the remaining gates of the Bonnet Car
Spillway, which permits overflow fro
the Mississippi River into Lake Pon
chartrain just above New Orleans, wi
be opened. Completed in 1931 at a co
of $13,000,000, this waterway with 25
gates open early this week was carryin
200,000 cfs. It is expected to discharg
250,000 cfs. with all 350 bays ope
(See *ENR* March 29, 1945, vol. p. 42
for details of stage reduction at Ne
Orleans due to use of Bonnet Carr
spillway.)

The high stages along the Mississipp
are resulting from several weeks o
heavy precipitation over much of th
lower Mississippi valley and Easter
Texas. Record stages are now being re-
corded on some tributaries of the Mis-
sissippi and near records on others. A
Fulton, Ark., the Red River a few days
ago exceeded the previous high flood
stage of 37.4 ft., the great flow being
due to a large extent to the high dis-
charge of the Little River in Oklahoma,
which joins the Red at Fulton. This rec-
ord stage has resulted despite the fact
that considerable water is being stored
at Denison Dam farther upstream on the
Red River.

Comment and Discussion

eaders' opinions on matters that concern engineers and contractors

gastel Bridge

: The photographs and descrip-
in the March 1 issue of *Engineer-
News-Record*, describing the de-
tion by the Germans of the
ous Plougastel Bridge across the
n River near Brest are of interest
veral respects.

October, 1929, while still under
truction, I had an opportunity to
this job in company with P. H.
s of the Bureau of Standards, Mr.
y, resident engineer for the De-
ment of Bridges and Highways,
a Mr. Davaux, chief engineer of
struction of the French Navy.

may be of interest to you to know
calcium aluminate cement was
d in the construction of the piers
point above high water, inasmuch
hese piers were exposed to the cor-
ive action of sea water. The mix
sisted of 400 kilograms of "ciment
du," 200 liters of fine sand, 200
rs of crushed fine stone and 800
rs of coarse stone. In the larger
sses, large stone (man size) in an
ount equal to one-third of the
ume of the mass were carefully
dded in the concrete.

Joshua L. Miner
Vice President
Atlas Lumnite Cement Co.
New York, N. Y.

•

acing Faults

: It is not clear to me wherein con-
ts Mr. Ned L. Ashton's disappoint-
nt in my proposed system of brac-
, as he comments in *ENR* Dec. 14,
4, vol. p. 741. The incident which
relates, of vibrating with a 2x4 a
0 ft. section of the North American
iation plant, in Kansas City, con-
ns my objection to the conventional
thod of bracing where members
e assumed to act in tension only.

In my article (*ENR* Nov. 16, 1944,
l. p. 627) I accentuate lack of stiff-
ss as an objection to the conven-
nal method of bracing, in pointing
t that the assumption of tensile
ress only cannot be realized, even
hen X-bracing with angles is used.

At the time when tension member bracing is fastened, the possibility exists that the structure is very slightly tipped in one direction. Then, when forces are applied acting opposite to the direction towards which the structure tended at the time when the bracing was applied, there is an infinitesimally small distance through which the structure can move almost unobstructedly before the opposite set of tension diagonals come into action.

This condition, of course, is not so severe in the case of bracing with tension angles. Yet, because the bracing was not designed to withstand compression stresses, considerable elastic deformation is bound to take place when the latter form of stress is induced. A long structure, such as Mr. Ashton mentions, will therefore deform considerably more when braced in the conventional manner than in the case of my proposed bracing, which would be designed to withstand both tension and compression. Of course, as Mr. Ashton is well aware, deformation can be controlled and reduced only to an unobjectionable minimum, but not entirely eliminated.

I fail to see why the condition of temperature stresses would be more acute in connection with the proposed system of bracing than in the case of the old conventional bracing! Also, here, I believe, the favorable argument is the other way around. Where it is called for, temperature stresses must be given attention, regardless what system of bracing is used.

Arnold A. Weitzman
Detroit Michigan

Temperature Moments in Frames

Sir: The article, "Moment Distribution by Symmetry and Anti-Symmetry," by D. B. Steinman (*ENR* Jan. 25, 1945, vol. p. 135) is an interesting application of the author's "Method of Linked Rigidities" (*ENR* June 1, 1944, vol. p. 802) to symmetrical structures. In these cases unsymmetrical loading may be divided into symmetrical and antisymmetrical components, and solution is obtained by use of the end-rotation constant first derived by Hardy Cross. The end-rotation constant, however, is also applied to the problem of side sway. That the ordinary method of moment distribution may be used for these short cuts is explained by the author.

These expedients may be applied to the computation of temperature moments in symmetrical frames. As elongation of the top strut produces symmetrical deformation in that member, its rigidity then should be halved before proceeding with the distribution of the fixed-end column moments. In bents with columns fixed at the base the rigidity of the columns is not modified, and distributed moments are carried over in the columns, although not in the strut. If the columns are hinged at the base, three-fourths of the column rigidity is used, and no carry-overs are necessary. For closed frames symmetrical about both axes, in which the top strut elongates with respect to the bottom, column deformation is antisymmetrical and column rigidity is increased 50 per cent before distributing fixed-end column moments; no carry-overs are required. When the top and bottom struts are not of equal section, the column deformation is not perfectly antisymmetrical, and the foregoing does not apply, although it may serve as a useful approximation.

C. H. Gronquist
Associate Engineer
Robinson & Steinman,
Consulting Engineers, New York, N. Y.

Snow Fighting

Sir: The municipal snow fighting symposium, published in the Dec. 28, 1944, issue of *Engineering News-Record*, vol. p. 816, is most interesting.

Here in the north of England we have experienced fourteen days of the worst snow conditions for fifty years. I was fortunate in having a Caterpillar D4 working, which I was able to hire from a contractor, my own Cletrac being under repair. Difficulties with labor and transport were apparent in many towns.

May I respectively suggest that another article on snow fighting, with illustrations including overhead snow loaders, if any are in operation, be presented?

G. Holden
Chief Sanitary Inspector,
Whitley Bay Urban District Council
Whitley Bay, England

EDITORIALS

VOLUME 134 NUMBER 14

April 5, 1945

Postwar Construction Costs

THE GRAPH ON THE COVER of this issue, which charts rising labor costs, places this problem before the construction industry: With labor rates in both the field and factory going up, can construction costs be held down? If it is a reasonable assumption that labor rates will continue at current record highs, then the only possibility of reducing construction costs will lie in the improvement of engineering techniques and management efficiency. We are confident that such improvements will be forthcoming eventually and that they will result in an overall reduction in construction costs. However, new techniques and higher efficiency in construction management cannot be developed overnight. Therefore, plans for the immediate postwar period must be based on costs at or near the present levels.

Airplane Noise Should be Considered

A SUBJECT needing serious consideration by postwar planners in their schemes for airports in every community is the growing evidence that airplane noise can seriously affect real estate values along the approaches to landing fields. Existing buildings are poorly insulated against external sounds, and from present indications no improvements in acoustic protection are planned. The vulnerability of these structures to the penetration of sound is well known to people who live near airfields or along air routes. They grumble now, even though present air traffic is light compared to what is predicted for the postwar era. They may be expected to grow more vociferous in their complaints as the noise increases and will surely bring legal pressure to bear against the airlines to obtain relief. If these legal actions are successful, severe restrictions are likely to be imposed on air traffic; if unsuccessful, residential areas along the routes and near the airports are likely to be abandoned or to become slums. No solution to the problem that is raised by the noise of low-flying airplanes is apparent, but that is all the more reason for studying it carefully while the postwar airport program is sti largely in the planning stage.

Personnel as an Investment

ELSEWHERE IN THIS ISSUE Wm. V. McMenime recommends to contractors that they begin now t build the organizations that they will need whe the postwar construction boom comes. This, h states, will take some of their capital, but he add that dollars invested in personnel will depreciat less than any other security. On the basis of contacts with the Seabees in the Pacific he recommend consideration of armed forces personnel who hav learned to get things done. "These men, who a yea or two ago were considered too young to carry o large projects, have developed a confidence in themselves that they normally would attain only afte many years of experience. They have been working under pressure and in trying conditions and know how to get results." Waldo Bowman's dispatches from Europe give emphatic support to Mr. McMenimen's conclusions. Right now some men are being released for minor disabilities. They merit consideration on a basis of what they can do in the future in a contractor's organization.

Foreign Construction Contracts

THOSE WHO HAVE CONCLUDED that Europe and South America offer unlimited opportunities for American construction men after the war should read Mr. McMenimen's observations on that subject (vol. p. 459). Based on his experience as general manager of a large contracting organization that has done much foreign work, Mr. McMenimen concludes that those countries hold little in the way of prospects for contractors from this country. Europe will need to provide work for her own contractors and construction men. He can visualize European countries borrowing money from our government to buy materials and equipment here, but he "cannot picture foreign governments paying interest on money borrowed in the United States to pay profits to American contractors." As to South America, he states that while countries there do not lack capital, they will use it chiefly to buy our construction equipment; and as they will be able to pay much less for labor than American contractors would have to pay, they can make it practically impossible for U. S. contractors to take work there on a profitable basis. Offsetting this pessimism as to foreign prospects is Mr. McMenimen's conclusion that at home, after the reconverperiod, we will have one of the greatest booms have ever had in the construction field. He rec- mmends that our contractors keep their eye on ne markets.

Epic Struggle

TWEEN THE LINES of the first fragmentary ports of the collapse of the Remagen Bridge ile Army Engineers were attempting to repair it e could find evidence of a fearless struggle ainst great odds. Now that we have fuller details Waldo Bowman's cable of last week the magni- de and heroism of that struggle stand out in bold lief, marking it as one of the major epics in the story of the Corps of Engineers.

The great arch trusses were much more seriously maged by German demolitions than the first ports indicated. Out of sight of casual observers, portant members of one truss were completely vered. The mystery now is not what caused the ch to collapse but what kept it from collapsing r ten days. Once the engineers had examined the an, the possibility—even the probability—of its llapse became all too apparent.

Meanwhile the armored forces were pouring cross the bridge oblivious to its precarious condition and hampered only by the accurate shelling nd dive bombing of the enemy, attacks that did rther damage to the bridge. That flow of troops the east bank added to the problems of the Army ngineers. Not only was it necessary for them to ave the bridge if possible by repair and by lighten- g the load on the damaged truss, it also was neces- ary to provide pontoon spans to carry supplies nd reinforcement to the troops on the far shore hould the bridge collapse.

How the engineers went about their perilous sks is told vividly in Mr. Bowman's cabled dis- atch (*ENR* March 29, vol. p. 413). His knowledge f bridge design made it possible for him to seek ut and supply the details that engineers want for better understanding of what happened. These etails serve only to enhance appreciation of what as done by the men on the bridge and on the two ontoon crossings that were built under fire.

The great bridge was lost, and with it about 30 f the many men who boldly risked their lives in he attempt to save it. But the bridgehead was aved and made secure, and that is what counted.

More Fighting Spirit Needed

IS THE DAY of the indomitable, two-fisted contractor past? Are big contracting firms so fearful of labor racketeers that they will foster the spread of rackets within the ranks of organized labor by supine acceptance of demands made upon them? These questions are raised by a review of evidence brought out in the trial of men charged with extortion from contractors on New York City's Delaware Aqueduct (*ENR* Mar 15, vol. p. 358 and March 22, vol. p. 370).

This case appears to be one that calls for plain speaking lest continuation of such meek acceptance of extortionary demands from labor racketeers may endanger the whole system of doing public work by contract. By implication, the meekness with which large contracting firms made these payments would indicate to the public that such payments are the rule rather than the exception, and that as a result, when construction is done by contract, part of the cost is a hidden tribute to labor racketeers.

The "shakedown" on $66,000,000 of work on the Delaware Aqueduct is said to have been over $700,000. Testimony at the trial indicated that $50,000 had been paid to insure "labor peace" on the contract for the New Jersey approach to the Lincoln Tunnel at New York. When such large payments are made without a fight the public cannot but conclude that the contractors' profits were so large as to make the payments of little moment to them. Which conclusion leads inevitably to the further question: Does a public agency such as the New York Board of Water Supply get the benefit of real competitive bidding when it lets such large undertaking to contract? Contractors can hardly condemn public agencies if they explore that question when other large public-works projects are under consideration.

These are issues that need to be faced frankly by construction contractors. A great era of postwar construction lies ahead. Unless public confidence in the contract system of doing public work can be maintained, irreparable damage will be done. Contracting already is on the spot in the face of demands for river valley authorities that will do all river-development work by force account, as was done by the Tennessee Valley Authority. Public confidence can only be maintained by a revival of the fighting spirit that once characterized the contracting industry.

NGINEERING NEWS-RECORD WALDO G. BOWMAN, *Editor*
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DWARD J. CLEARY, *Managing Editor*. *New York:* V. T. BOUGHTON, H. W. HUNT, E. R. DENMARK, T. D. MacGREGOR, and H. P. ORLAND.
Chicago: H. W. RICHARDSON, J. R. CARR. *Washington:* PAUL WOOTON, A. N. CARTER. *San Francisco:* N. A. BOWERS.
DITORIAL OFFICES: 330 WEST FORTY-SECOND STREET, NEW YORK, N. Y.

AN ENGINEERING NEWS-RECORD FOREIGN REPORT

Engineer Preparation for the Rhine Offensive

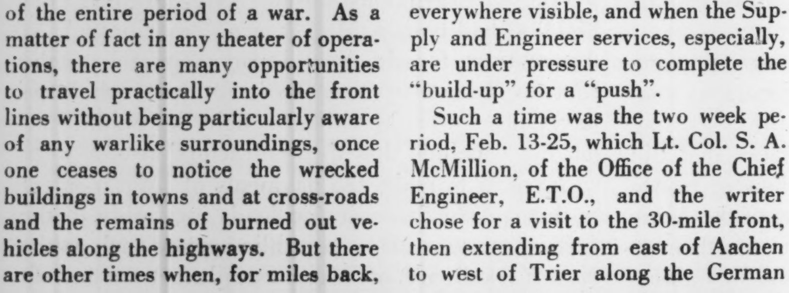
Waldo G. Bowman
Editor, Engineering News-Record
(By airmail from the European Theater of Operations)

Contents in Brief—*Back of the Rhine offensive that made the headlines in the past few weeks was a vast amount of unpublicized but very necessary advance preparation. In this report Mr. Bowman gives a quick survey of the road maintenance problems, bridge reconstruction and river crossing tasks assigned to the Engineers.*

TIMES OF SUSTAINED, large-scale fighting, when actual clashes of arms occur, occupy only the minutest fraction of the entire period of a war. As a matter of fact in any theater of operations, there are many opportunities to travel practically into the front lines without being particularly aware of any warlike surroundings, once one ceases to notice the wrecked buildings in towns and at cross-roads and the remains of burned out vehicles along the highways. But there are other times when, for miles back, everything seems to be moving and everyone is tense with a feeling of impending events, when war activity is everywhere visible, and when the Supply and Engineer services, especially, are under pressure to complete the "build-up" for a "push".

Such a time was the two week period, Feb. 13-25, which Lt. Col. S. A. McMillion, of the Office of the Chief Engineer, E.T.O., and the writer chose for a visit to the 30-mile front, then extending from east of Aachen to west of Trier along the German border. Before the period ended the entire line had erupted into action. The long-awaited Battle for the Rhine was on, and ten days later, on March 6, American troops and armor entered Cologne.

Back of the luster of this success and of the other drives toward Wesel, Duisburg, Dusseldorf and Coblenz, indeed accounting for it to an unusual degree, were substantial achievements of Engineer officers and troops in meeting the problems posed by the necessary preparations for this Rhine offensive. Some of these problems and achievements, notably railroad bridge-building in the front-line area, are covered in separate articles, but there are others as significant and interesting that lend themselves to briefer presentation. This is it.



Sudden and unseasonal thaws drove the frost out of the badly heaved roads making many of them so soft that they had to be surfaced with corduroy. Roads were surfaced one half at a time to permit traffic to pass. Cross logs were covered with wire mesh and then topped out with broken stone and earth binder.

Historic frost heaves

It will be recalled that the invasion of the continent was postponed several times on account of the weather, and that General Eisenhower finally gave the word to go when many uncertainties still existed. The Rhine offensive must have been equally delayed, and finally also ordered under some uncertainty caused again by the weather, which this time made itself felt through broken down roads. The spring thaw has come several weeks sooner than in any year of record, and in addition its effect was unexpectedly severe. The frost came out of the ground quickly, softening the subgrade and producing badly cracked surfaces. The Engineers immediately advised the Armies to close every possible road to traffic until the frost was out. Those roads that were so closed were in usable condien the drive started. In too ases, however, the advice was owed, and miles of road in the areas, over which supplies ave to move, became all but ble.

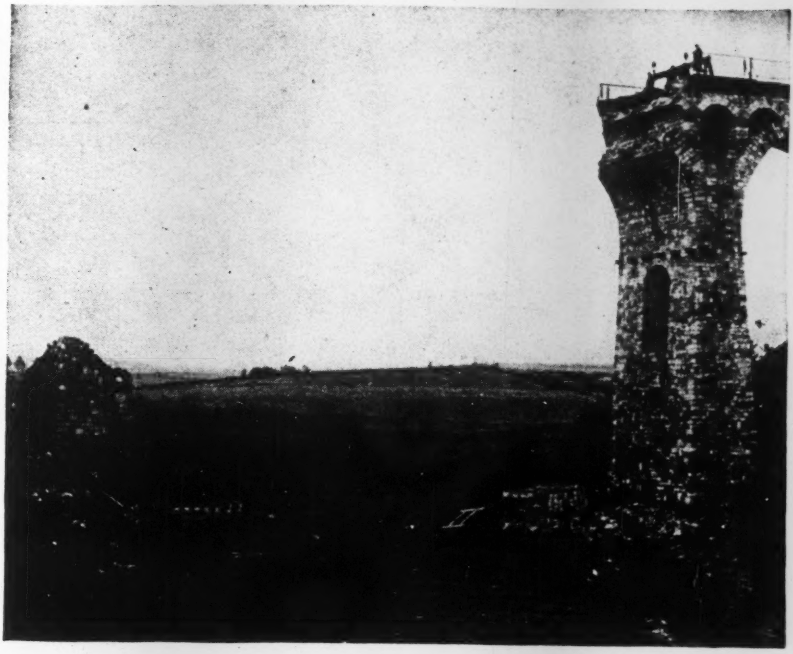
the battle began to keep them Every truck that could be was put to hauling rock to fill es, which seemed bottomless traffic soon pushed the rock sight. Moreover, rock filling l was not plentiful, so that in tion some of the road repair ok it from adjacent railroad Even ties were taken in some es, leading the commander of ineer general service regiment, had the job of rehabilitating lroad, to remark that while he ope with enemy demolitions he help to handle the destruction by his comrades-in-arms.

ddition to filling the holes, ge was improved by side es and transverse feeder ditches the shoulders, which were by hand since graders would locked traffic, and could hardly oved the sticky mud anyway. re were not nearly enough gen- ervice regiments and combat eer battalions in the theater to ith the job, and infantry and rmored units were assigned to n the emergency. Finally such ay measures, proving insuffi- the troops were assigned to ng corduroy surfaces over the worst sections, which added up to many miles. This had to be done on half the road at a time so that traffic could continue to move on the other half, and this slowed progress as did the complications of securing timber, all of which had to be cut by military forestry units.

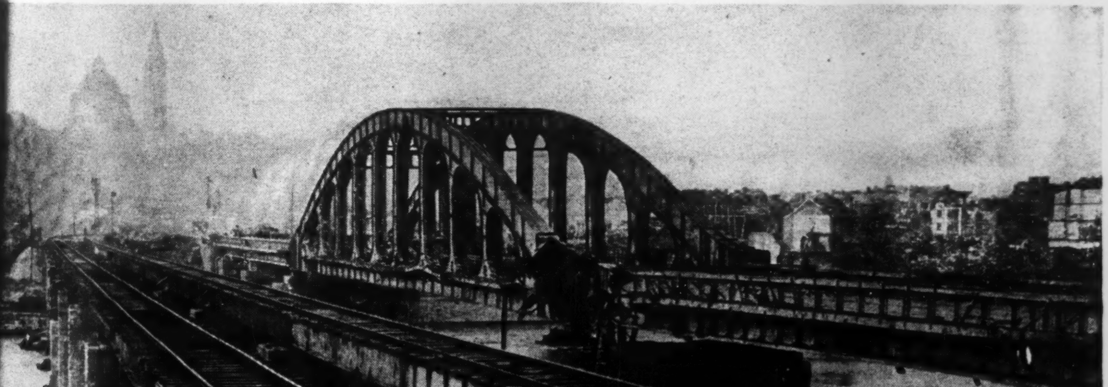
That the road situation was serious is evident from the fact that on several occasions flights of 75 or more C-47 transport planes had to drop supplies to troops by parachute in some of the isolated areas.

The top officers whose responsibility it was to set D-day for the Rhine offensive will not soon forget the

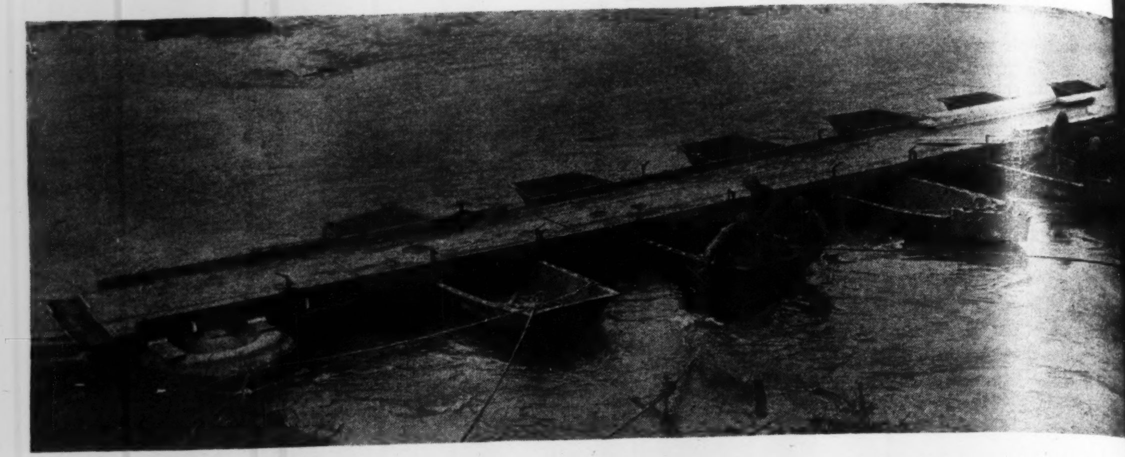
(*Continued on p.* 84)



Corduroy surfacing (lower right) being laid past a wrecked railway viaduct which an Engineer general service regiment is starting to restore. On the low concrete pier being built at the left, a 70-ft. high steel tower will be erected to carry the spans of meter beams that will replace the destroyed arches.

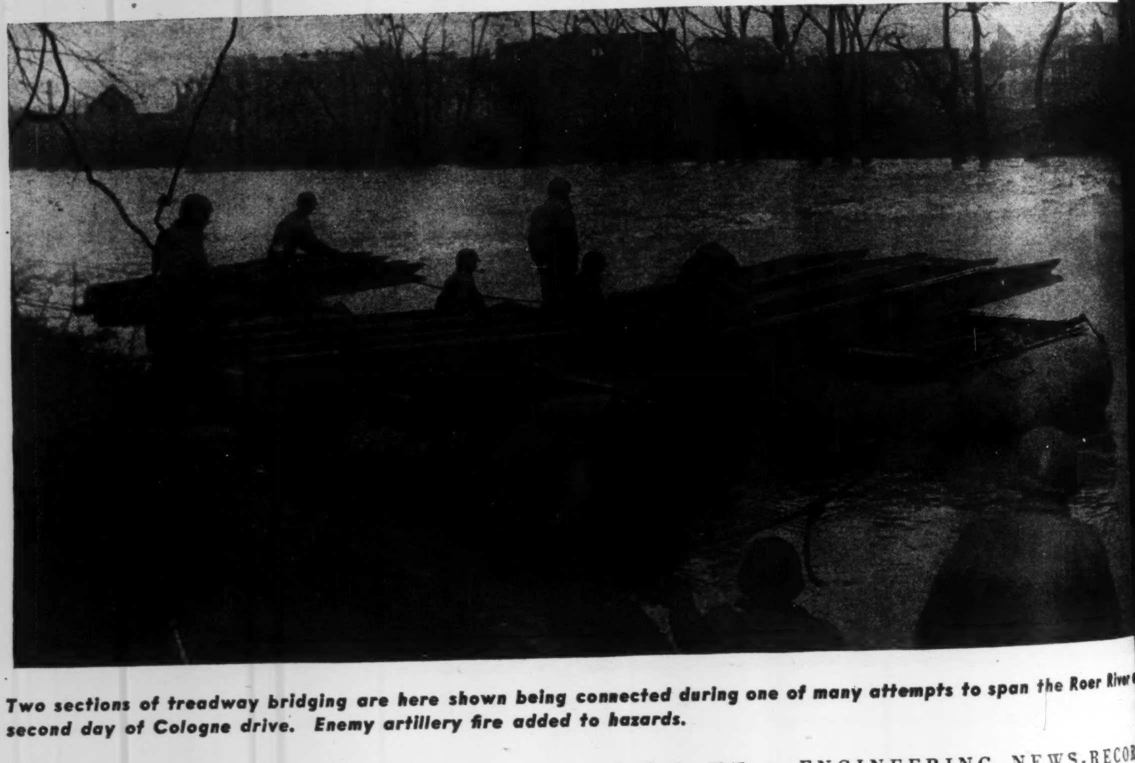


ite the severe damage to the Vierendeel truss of the railroad bridge at the right it was used to carry highway ic while the other railroad bridges at the left were being repaired.



First vehicle crossing of Roer Riv
Duren, Germany, was this infantry
port bridge (above) shown being
more stable by the addition of
bows on the assault boats used as
toons. Note hinge between sectio
lower left corner. Shortly after
bridge was put into service the tr
way bridge shown in other illustra
was ready.

At left, First Army engineers pu
section of treadway bridge into p
on second day of American at
aimed at Cologne.



Two sections of treadway bridging are here shown being connected during one of many attempts to span the Roer River second day of Cologne drive. Enemy artillery fire added to hazards.

ecial crane truck (above) backs s the partially constructed tread- bridge with the final two sections bridging suspended from the lift.

last two sections of the bridge are set in place (right) with the aid two crane trucks of special type. planked landing ramp in fore- nd prepared by bulldozer.

adway bridge completed and in use by first truck convoy, but engineers are already replacing a pneumatic pontoon t has been punctured by shrapnel from enemy shells.

trouble resulting from frost heaves in eastern Belgium in February, 1945. Those bottomless roads may well become historic.

The difficult road conditions were not, of course, confined to the forward areas, but extended far back on the supply routes. One difference, however, was that the maintenance forces were ready for them there, particularly around Reims where frost heaves are a yearly occurrence, a result largely of the impervious underlying chalk that restricts drainage.

In peacetime the French just shut the roads to traffic, let them crack and open up (they do not buckle as do many of the roads in the U. S.) and then when the frost is out, provide the minor surfacing repairs that are necessary. Since most of the roads in northeastern France, as well as in Belgium and Luxembourg, consist of only of an inch or two of asphalt surface on a very poor base, such a procedure is obviously wise. But in wartime it was largely impossible and, as a consequence, the Engineers had a nip-and-tuck battle to keep the roads open for the offensive.

Bridgebuilding also high-pressure

Not because of the weather but because of the German counter attack of December-January, which in combination with our bombing wrecked most of the stream crossings, bridgebuilding too was an Engineer task of great urgency. One unusual characteristic of the work was that we were often rebuilding bridges that we had only completed a few weeks before. By the end of the program our Engineers accepted such a situation quite as philosophically as some of the French and Belgian contractors, who since 1940 are said to have built the same bridge as many as five times. One contractor just leaves his equipment at the sites so it will be there when next the bridges require reconstruction.

The largest of engineering and construction jobs were required on the railroad bridges and on the highway bridges over the Albert Canal in Belgium, both of which are to be covered in detail in separate articles, but reference should be made to the fanciest Bailey bridge yet built on the Western Front. A product of Ninth Army Engineers, it crosses the Albert Canal in a clear span of 175 ft. with 100-ft. approach spans at either end, and all supported on 50-ft. high towers also assembled from Bailey bridge panels. The towers were set by crawler crane, and the "double-double" span (*i. e.*, each truss being two panels wide and two panels high) was assembled on one bank of the canal and cantilevered across with the aid of a launching nose. A bulldozer pushing against the end of the span supplied the power.

Reference to the Albert Canal will bring the Vierendeel rigid-joint truss bridge to mind of every American bridge engineer, for it was over this important waterway that more of these structures, both riveted and welded, were built in the 30's than existed in all the rest of the world combined. All were destroyed, mostly by the Belgians themselves in 1940, and only temporary crossings have taken their place.

In only one case can it be said for certain that a Vierendeel type bridge will again span the Albert Canal. This is at Liege in a crossing to an island that separates the canal from the Meuse River. No bridg had been located at this site befor but one had been planned. When th war began the steel for a rivete Vierendeel span had been fabricate and the falsework set for its erectio No more was done until we move into Liege, when this bridge came t the attention of our Engineers. The immediately set the floor steel and th bottom chords on the available fals work and had a deck-girder bridge i service in a matter of a few day Now a Belgian contractor is erectin the top chords and the verticals o the trusses, so that soon another Vierendeel truss will span the Alber Canal.

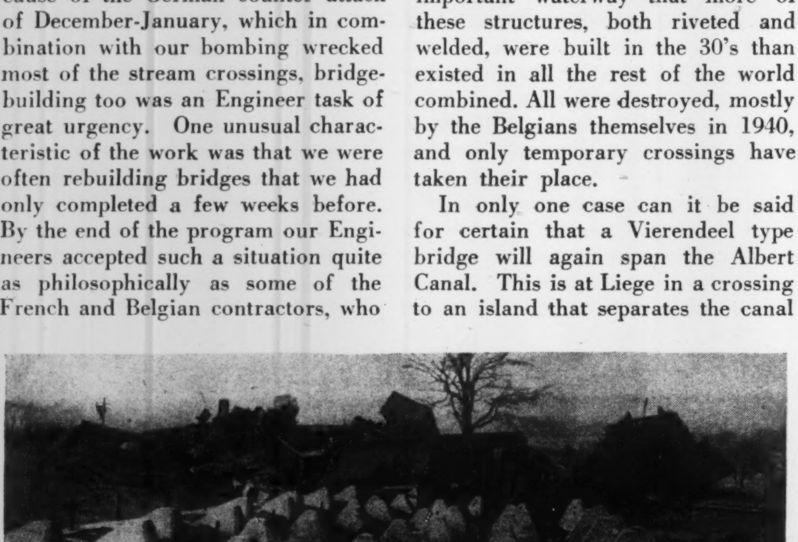
In Liege, too, is an example of Vierendeel railroad bridge (over th Meuse River) that took a bad mauling from an explosive charge whic split open the top chord of one trus just over the shoe, but did not dro the structure into the stream. As matter of fact, although calculation showed the span to be unsafe for railroad loadings, it has been converte to a highway bridge, and is in constant use.

Directly beside this bridge, as shown in one of the accompanying illustrations, were two deck girder railroad bridges, on one of which our demolitions blew out several meter-beam spans (put in by the Germans in 1940), and broke off the top of one of the concrete piers. This pier was repaired by concrete encasement and an 11-ft. high grillage of meter beams.

First crossings are the toughest

Such jobs as these, however, located from 10 to 20 miles behind the front, differ not a great deal from what they might be in peacetime except for an occasional air raid or buzz bomb. It is the first bridge across—the light pontoons and the heavy treadway pontoons—that are the real war bridges. They can be built in a matter of hours if there is no enemy opposition, or they may take a day—or a lifetime. They are the kind of bridge that could be statistically catalogued as requiring just so many Engineers lives per foot of crossing.

A dozen or more had to be built along that 30-mile front before the Rhine offensive could get rolling, and the combat battalions who do these jobs, which include ferrying the first troops across in assault boats, have



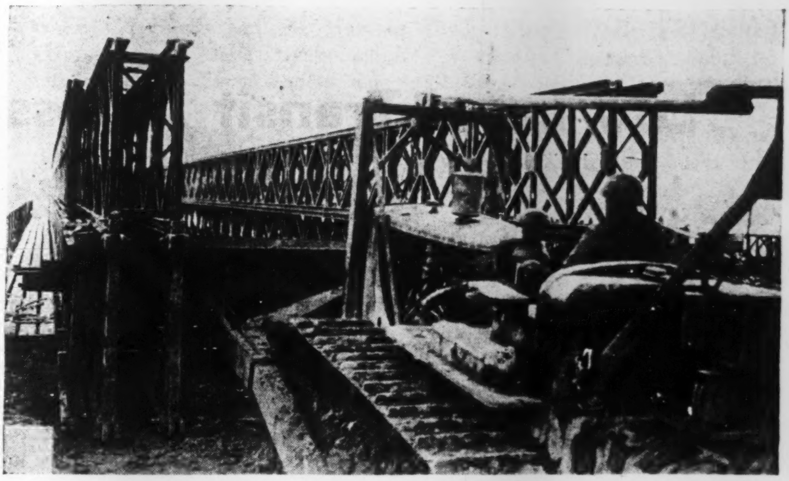
Extra work for the Engineers appears with surprising regularity. An unusual task was picking up this railroad wreck, of unknown cause, among the "dragon's teeth" of a tank obstacle in the Siegfried Line.

of the toughest assignments of ern warfare.

here was, for example, the tread- crossing of the Roer at Duren Feb. 23. The banks were muddy slippery because the river, ordi- ly a cow-pasture creek, had been flood as a result of the Germans harging water from impounding rvoirs they controlled upstream. threat of such an artificial flood indeed, been one of the German's defensive weapons in this area e, by progressive release of water ugh a string of seven dams the am level at Duren could have been sed 18 ft. Fortunately we cap- ed several of the dams so that the rst was avoided, but the water t did come down caused a sub- ntial rise, aided as it was by local ns. Although receding, the Roer s a swift-moving stream when the ders were given to cross it.

Before the treadway could be tried, antry footbridges had to be gotten oss, and then an infantry support idge that could take a truck towing ht artillery. Several footbridges d part of the infantry support idge were lost to Nazi mortars and swift current before the crossings re made to stick. It was the next y before things were quiet enough the treadway operations to begin, d even then the site was shelled eral times.

The story of this treadway is best d by the accompanying sequence of tures and captions. The combat gineers built it in less than a day, d a week later, with the Roer be- nd them, they were all set to dupli- te the crossing on a vastly bigger le over the Rhine. And as these gineers moved ahead, those of the neral service regiments moved in hind them, sometimes caught up th them, to replace the floating ghway bridges with trestles, to ild railroad bridges and to con- uct any of the other facilities that uld be needed to support the drive d keep it moving.



The largest Bailey Bridge operation on the Western Front was the successful launching of a 375 ft. span across the Albert Canal to form a crossing consisting of two 100-ft. approach spans and a 175-ft. central span. Here shown is a tractor pushing the spans out across the openings.

On to the Rhine

These engineers of the general ser- ce regiments also often undergo en- y fire, and particularly the rail- ad bridge reconnaissance parties hose job it is to know what bridges ll have to be rebuilt, and to what tent, as soon as they can be cap- red. In this connection, several days before the drive for the Rhine began each of the general service regiments in the area had complete drawings and material lists for nearly every important bridge the Germans were still using. It was recognized that the plans might have to be changed, but in most cases enemy demolitions have been about as expected both in type and severity so that remarkably close pre-planning is possible.

The railroad bridges to cross the Rhine were in no different category than those across the little streams with unfamiliar names; they, too, were pre-designed for every possible location and, moreover, to such a degree that in one instance, at least, the effect of secondary stresses caused by possible uneven settlement of supports was being investigated. Although perhaps an unusual refinement on a military structure, which could readily be saturated with other secondary stresses of completely unpredictable origin for which no advance account could be taken, it is typical of the care being used to assure the success of the most important bridging job of the war.

And if this is not enough, there is the optimism of the field men who will have to build the bridges. The more rugged individualists among them even say that the designers are making too much of a fuss over what is going to be just another bridge. "Get us the materials and equipment" they say "and we'll build a railroad bridge across the Rhine to meet any schedule that the generals have in mind."

One of them, in fact, refuses to take advantage of this material and equipment hedge and just counts on the supplies being available, influenced no doubt by an experience of a month previously when a car of lumber standing on a sawmill siding got loose, ran down a mile-long grade, through a crowded railroad yard and on for several miles until it finally crossed a 70-ft. gap where a bridge had been blown out leaving only the track suspended between the abutments. The payoff came when the car reached the far side of the hanging track, tipped over and deposited its load right at an abutment whose construction was being delayed by a lack of form lumber.

If a man is so much of an optimist that he thinks such providential manna could drop into his lap twice in a lifetime, it is not surprising that bridging the Rhine, in two weeks, 10 days or even a week, is not looked upon as an impossible task. As a matter of fact, and as food for thought, an 850-ft. railroad bridge was built across the Moselle at Metz during a time when the river was in flood, and it took 65 men of a general service regiment just 16 days. No Rhine bridge will have to cross more than about 1,200 ft. of water, and some a lot less. It could well be that the Rhine crossings will be "just another bridge."

Low Level Transit Across the Andes

Charles Jay Seibert
Civil Engineer, Washington, D. C.

THE OPENING of the Lima-Iquitos highway across the Andes and down the Ucayali River, described in *Engineering News-Record* (Aug. 24, 1944, vol. p. 222), does much to emphasize the importance of the deep Amazon water ways as a major link in transcontinental routes across the northern part of South America.

The geography and climatic conditions of the vast region known as the Oriente—meaning the western lands of South America that abut the Andes on their eastern side in Colombia, Peru, Ecuador and Bolivia—are not as well-known as they should be. Far from being pestilential and unfit for human habitation the contrary is true, and their inherent conditions are much superior to the conditions encountered by the American pioneers when they pushed through the trails to California and Oregon and finally settled the western part of the United States.

These trans-Andean routes are valuable because they must, ultimately, influence a rapidly rising tide of settlement in the Oriente. This territory could easily provide living space for many of the people from war-torn Europe. Settlement of these barely populated lands may even be a factor in preventing a future world war.

The opening of the Lima-Iquitos route might well be the fore-runner of a vast, new international development. To hasten this development it would be well to examine the possibilities of all routes that would provide fast and safe transit across the tropical part of the South American continent, and which could take advantage of the Amazon and its many thousand miles of deep waterways.

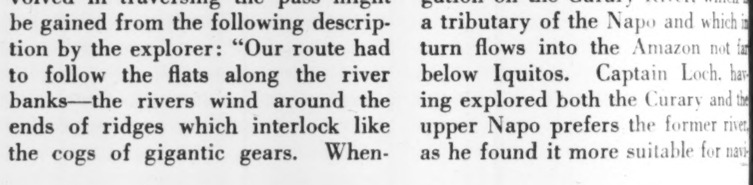
One such route was discovered in 1936 by Capt. E. Erskine Loch, D.S.O., who made explorations in 1935-36 in the Llanganatis mountains. Captain Loch's junket was made with the dual objective of gathering data on flora and fauna for the American Museum of Natural History and for the purpose of discovering a route from the highlands of Ecuador into the Oriente for the government of Ecuador—a territory that is traversed by several important tributaries of the Amazon. Those interested in the details of the expedition are referred to Captain Loch's narrative, *Fever, Famine and Gold,* (G. Putnam's Sons, N. Y. 1938.)

From an engineering standpoint it is sufficient to state that Captain Loch found the pass; at present its condition is such that its passage entails many hardships and dangers. Captain Loch being a trained British army officer with an engineering eye, is convinced that at relatively little expense and effort the pass could be developed into a safe roadway giving quick access to the Ecuadorian Oriente from the west.

Some idea of the difficulties involved in traversing the pass might be gained from the following description by the explorer: "Our route had to follow the flats along the river banks—the rivers wind around the ends of ridges which interlock like the cogs of gigantic gears. Whenever a cog ended in a sheer cliff directly on the river we had to find path over the ridge, climbing man hundreds of feet above the river, an invariably we would come back to th valley only a few hundred yard ahead of where we had left it."

And he goes on to remark, "B blasting a cut around the ends o these spurs, river flats could ver easily be linked into a roadway. Th construction of this new and direc route between the civilized part o Ecuador and the great Oriente woul open up this rich territory to th world. The Curary River route t the east will assure development o the region." Reference to the accompanying map will show what th explorer visualized.

Briefly, the route recommended i as follows: From Ambato, on th Guyaquil-Quito Rwy., a highwa would be built to the head of navigation on the Curary River, which i a tributary of the Napo and which i turn flows into the Amazon not fa below Iquitos. Captain Loch, having explored both the Curary and the upper Napo prefers the former river, as he found it more suitable for navi



The proposed road as shown from Ambato to the head of navigation on the Curary River would provide quick and safe access to the Ecuadorian Oriente from the west. Advantage could then be taken of the Amazon waterways.

gation than the upper part of the latter. Hence, though the pass leads to the Napo he considers carrying the proposed road to the Curary. The distances are closely approximate to the following:

From Guyaquil to Ambato via the Guayquil-Quito Rwy. is 186 mi.; Ambato to the Cuarary River via road through the pass is 124 mi.; and Curary River via Napo and Amazon to Iquitos is 540 mi.; a total of 850 mi.

The present Lima-Iquitos route is as follows: From Lima to Pucallpa via road is 519 mi., and from Pucallpa to Iquitos via Ucayali and Amazon rivers is 646 mi., the total distance being 1,165 mi.

There is no intention to question the value of the Lima-Iquitos route; to the contrary the road should prove of great social and economic value. It might, however, be remarked that the Peruvian road reaches elevations as high as 14,260 ft. The pass discovered by Captain Loch lies lower, probably less than 6,570 ft., and his recorded elevations were, for the most part, less than 5,910 ft. in difficult terrain. Even Quito, which lies higher than Ambato, is only 9,350 ft. This lower elevation of route has some bearing on the subject due to the effect of high altitudes on internal combustion engines and on the human system.

That the importance of east-west highways through the Andes into the Oriente is growing is evidenced, not only by the Lima-Pucallpa highway but by the surveys made recently to determine a route from the highlands of Bolivia to the Madre de Dios River. This route has been considered important enough to cause the U. S. Government to furnish engineers from the Public Roads Administration to assist in surveys of the route. (*ENR* April 8, 1943, vol. p. 482). These studies are being made in spite of the fact that access to the Amazon via the Madre de Dios can be obtained only by going around the Mamore rapids.

As the vast resources of the Amazon basin become better known it is probable that the importance of the Purus River will be recognized and investigations will be made looking toward connecting the Purus with the Mamore by means of canals, by taking advantage of the many large rivers which traverse the territory between the Purus and the Mamore. (Unfortunately these rivers empty into rapids). Such studies would probably be justified because the Purus is completely open to navigation from Rio Branco (the capitol of Acre) to the Amazon proper. It is true that the Madeira-Mamore Rwy. goes around the rapids connecting the Madeira with the Mamore but due to conditions this railway has never proved of much value. There are valid reasons for this but it is not of importance here to go into that.

Sharing U. S. "Know-How" Valued by Latin American Engineer Trainees

Since 1941 a unique training program, jointly carried on by the United States government and private industry, has made available to some 150 young men of Central and South America practical training in the United States with private concerns. For a period of two years, these young men learn United States industrial, business, agricultural and mining methods by actually doing the work.

According to a report by John C. McClintock, assistant coordinator, Office of Inter-American Affairs, this practical demonstration of the good neighbor policy of assisting Latin American countries in their economic development programs already has produced results. Reports from returned trainees testify to the value of this industrial training, and an independent, nonprofit membership corporation, known as the International Training Administration, Inc., has been set up to operate on a world-wide basis to share the United States' technical and industrial "know-how" with other nations.

Industries cooperating

Industry as a whole has been approached to support the program and its response is gratifying. Of the 397 companies that were asked if they could cooperate by taking one of the Inter-American Trade Scholarship award winners for training, 92 percent responded in the affirmative. Federal, state, and municipal agencies likewise agreed to assist. To date, more than 200 private enterprises, labor unions and governmental departments have contributed actively to the training of the men. Care is taken that training projects selected will ultimately be of benefit to the trainee's own nation.

What these young men actually receive is a period of on the job experience in the particular trade or career they have chosen. The precept of "learning to do by doing" is followed. In announcing the Inter-American Trade Scholarship program of awards, emphasis was laid upon the fact that candidates would be expected to do manual labor in actual industrial and agricultural operations on an equal basis with young North Americans engaged in the same training. During the time they are training with private concerns, the trainees receive an average of $150 per month as a living allowance from their employer in lieu of compensation. Hence, while working, the trainees are self-supporting.

To obtain a reliable index with regard to the reactions of United States business men to the training program, the National Foreign Trade Council, in October, 1943, was asked to initiate an inquiry to its membership. It was the unanimous opinion of its Education Committee that the work could most effectively be carried on by an independent nonprofit membership corporation, recognized by the United States government, but having on its board businessmen interested in this particular type of vocational education.

Accordingly, the staff, facilities and commitments of the Inter-American Training Administration were converted into such a corporation under the laws of the State of Delaware, with the name International Training Administration, Inc., having headquarters in Washington. A board of directors representative of government, management and labor was elected. They are William L. Batt, William A. M. Burden, James B. Carey, James S. Carson, Elliott S. Hansen (ex officio), Harrison Jones, Julius G. Luhrsen, Robert J. Lynch, Clark H. Minor, John C. McClintock, Charles P. McCormic, Joseph C. Rovensky and Robert J. Watt.

Three-Nozzle Asphalt Spreader Fills Concrete Pavement Joints

A JOB-MADE ADAPTATION of an asphalt spreader for filling joints in concrete paving, which has been developed at the Moses Lake Army Airfield in Washington, does the work at about fourteen times the rate in miles per man-hour attainable with small tar pots and hand methods. Moreover, the machine is said to save about 50 percent of the sealing compound used and to do a much better job because of the pressure back of the distributing jets.

Essentially, the device is a standard type of bituminous distributor that has been equipped with a special rear end arranged to serve several nozzles. After the asphalt in the tank has been thoroughly heated it is circulated through a header at the rear of the rig where nozzles can be connected at a number of different points, thus taking care of various spacings of joints to be filled.

As shown in the accompanying pictures, three nozzles are attached. They are always close to a hot asphalt supply in the header, through which the asphalt is kept circulating. After the day's run the circulating system is flushed out with diesel oil to prevent asphalt from cooling and hardening in the pipe lines.

The essential parts of the arrangement are shown in Fig. 2. They are: (A) Discharge from pump to circulating header, a 1½-in. pipe; (B) return from header to tank, a 1¼-in. pipe; (C) sheet metal enclosure of header to retain hot gases; (D) pipe from tank at forward end delivers diesel oil for flushing; (E) one of the three asphalt delivery nozzles; (F) part of the pipe bracket frame shown in Fig. 1; (G) flue for escape of hot gases from enclosure around header; (H) an 8-in. conical strainer in the suction line to the pump, arranged for quick changing of screens. Considerable sludge is formed in heating the asphalt and special attention to screening this out is essential to successful operation.

Prior to development of this machine a crew of ten men using small tar pots had been able to seal only about 6 mile of cracks per day. With the machine and a crew of five or six men the rate of travel is about 1¾ mile per hour, or 14.5 times the speed per man-hour made with the hand pots.

Credit for development of his improved equipment goes to the organization headed by Capt. Joseph A. Hatch, post engineer, Moses Lake Army Airfield, Washington.

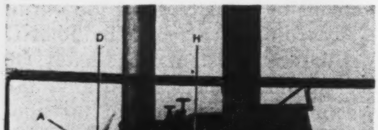


Fig. 2. Close-up of circulating system that keeps supply hot at nozzles.

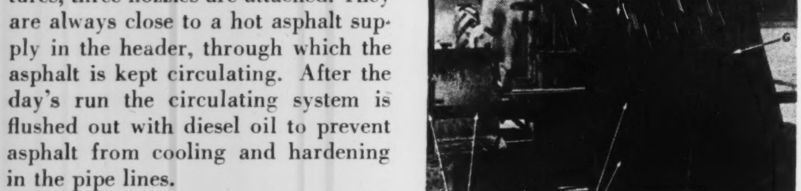


Fig. 1. Rear view of standard asphalt spreader adapted to serve three nozzles simultaneously. Nozzles may be connected at several points for varied spacing.

Chicago's Master Plan Lists Order of Projects

Formal announcement of Chicago's coordinated master plan was made recently by the Chicago Plan Commission through the issuance of a 78-page booklet describing a city-wide program of public improvements needed to insure the orderly development of the city throughout the next decade.

Compiled as a result of many months of study by the various local agencies and city departments, the public improvements embodied in the plan aggregate nearly $947,000,000.

Largest single item is $175 million for improvement and completion of the rapid transit system. Expressway construction is second at $167 million and water supply comes third with nearly $135 million. Another improvement, urgently needed, is an $84 million project of sanitary and stormwater sewer installation.

Order of construction stressed

Chief purpose of the booklet is to determine the proper order of construction for the several proposed projects. It is not intended to serve as a final recommendation for postwar public improvements, nor does it suggest that all projects listed in it be fully realized. Considerable importance is attached, however, to the need of testing each project against the overall needs of the city as they are "blueprinted" and made ready for construction.

Although Chicago's master plan necessarily will be revised and modified from time to time the new booklet, "Chicago Looks Ahead," will be of singular value in that it furnishes a concise record of the city's overall improvement plan. The booklet was prepared under the supervision of H. Everett Kincaid, executive director of the Chicago Plan Commission, of which A. H. Mellinger is chairman.

Floating Drydocks of the U. S. Navy

Part III—Unusual Plants for Construction

Hal W. Hunt
Associate Editor, Engineering News-Record

CLUDING THE SERIES of articles floating drydocks designed and under supervision of the Bureau Yards and Docks of the Navy, this icle describes methods of building t are unusual in the construction floating vessels. The first article the series, published in the March 8 issue, outlined the types of drydocks and their operation. The second, appearing March 22, described building methods and special basins used in construction of concrete and steel drydocks. Brief descriptions of the work at each of the 28 yards, appeared in the March 8 issue, vol. p. 329.

ATTLESHIP DRYDOCKS, BUILT AT PITTSBURGH

Sections of the largest floating drycks, some with a lifting capacity 10,000 long tons, have been built the steel mills of Pittsburgh and d down the Ohio and Mississippi ers to the Gulf, thence through Panama Canal and out into the ific where several sections rendez- at a spot for establishment of a vable naval base" for servicing largest of the fighting and comrcial ships.

More than 2,000 river miles were vered and 51 locks had to be passed getting the floating drydock secns to salt water. However, the vantage of building in the steel cenr of the world, with easy access to bricating plants and workers ined in handling steel, outweighed the difficulty of the long tow on the nd waterways. In addition, space r construction was available at the k door of the plant of the prime ntractor, Pittsburgh-Des Moines el Co. Here the project could be ndled with much less added pernel than at a separate assembly nt; moreover, equipment of the shop could be used on assembly work.

The assembly yard was established on what is known as the Ensworth Back Channel at Neville Island, Pittsburgh, and had two side-launching building ways, each constructed with four double-runner ground ways. Crawler-type cranes serviced the area with preassembled material delivered by rail from fabricating shops in the Pittsburgh area. A specially designed tractor-drawn track-wagon was used to haul from the nearby parent yard and from the rail siding, the latter at a considerably higher elevation than the building ways.

Shop welded assemblies

The prefabricated sections handled were as large as 35 tons with a maximum size of 10 to 30 ft. in width and 52 ft. in length, though delivery from subcontractor plants was limited to standard rail clearances. By fabricating and assembling in moderate size sections, most of the work could be planned so that welding was done in down-hand position. This was particularly desirable as a large portion of the welds were butt-welds and this arrangement assured more rapid work and higher quality than was obtainable in overhead position. Shop fabrication was done on heavy steel welding floors, where a true plane surface was maintained, providing greater accuracy and eliminating many of the fitting-up difficulties.

Automatic machine welding was used wherever possible, both in the shop and in the yard. The machines used fed a continuous reel of uncoated welding wire that made a weld on thick plate in one pass, using a granulated flux that completely inclosed the arc. The machines moved on wheels without a track; the operator had to check occasionally to see that the electrode did not wander far from the weld line but minor variations appeared to make little difference.

A method of wedging for faring and aligning plates before welding was used by P-DM with angle clips and bolts employed to draw the units to proper spacing for welds. Temporary parts were welded on one side only, sufficient to hold the work, but easily removed by tapping the opposite side with a hammer to bend the fitting-up pieces and thus break the weld.

The lower 6 ft. of the wingwall was erected vertically on the deck while the vessel was on the building ways—a practice that sped erection and insured accurate fitting of the wingwall. The supporting points had to be level with each other to a tolerance of ⅛ in. across the deck, a degree of accuracy obtained by instrument observation. The rest of the wingwall erection was completed at the outfitting dock, where the 6-ft. high sections were turned horizontally onto the deck and the structural erection completed in this position.

Launching in a narrow channel

The four double-runner ground ways at each of the two assembly areas had a declivity of 1½ in. per ft., necessary to obtain sufficient height to keep erection above high water. The ways were built with double runners 10 ft. apart, this con-

Reprints of the series of articles on floating drydocks are available at 15 cents per copy. Address requests to The Editorial Department, Engineering News-Record, 330 West 42nd St., New York 18, N. Y.

struction providing maximum stability for "sleds" used in launching and minimizing the hazard of a sidewise twist of the hull while it was in motion.

Cribbing of 12x12-in. blocks was laid up between the ways, some of it to heights of 15 ft. to permit construction on a level plane. Each set of cribbing was assembled with a tier of wedge-blocks, the wedges being released by backing-off bolts to lower the completed hull to launching sleds. The sleds were built quite heavy to straddle two ground ways. They were floated out on the water, lined up with the ways and pulled up under the hull in preparation for launching.

The narrow channel introduced a launching problem of some magnitude, and means had to be devised to decelerate the drydock section rapidly after its entry into the water. Precise calculations were made to determine the free velocity of the hull on the ways and the resistance of water to movement of the vessel.

Unusual snubbers

Conventional snubbing devices were believed to be inadequate for the high velocity that would be attained by the large moving mass, so a completely new means of braking was developed. Trenches were dug between each of the ground-ways to a depth of 4 ft., for almost the full length of the ways. In these trenches 6x6-in. timbers 3 ft. long and 3 ft. apart, strung on two separate cables, were placed. One end of each cable was dead-ended at the timber at the riverward end of the trench. The other end was taken landward, threaded through successive timbers to the top of the slope. Here the parallel cables were joined to a single cable. The trench was filled in with earth and tamped; the free single cables from each row of timbers were led back along the ground under the hull of the drydock section and drawn up and fastened to the deck on the river side.

Self-operation of these cable-and-timber brakes began as soon as the vessel righted itself in the water. The side movement of the drydock section, with cables attached, ripped the buried timbers bodily out of the earth, one after another from the top of each row to the bottom, exerting a powerful retarding force.

The outfitting wharf at the P-DM yard was built at the elevation of the deck of the drydock section when the water was at a normal pool elevation. Crawler cranes thus could move freely across the outfitting wharf and out on to the drydocks, an arrangement that greatly expedited operations. The drydocks were equipped step by step as they were built, the hull being assembled about the machinery and utilities as they were installed.

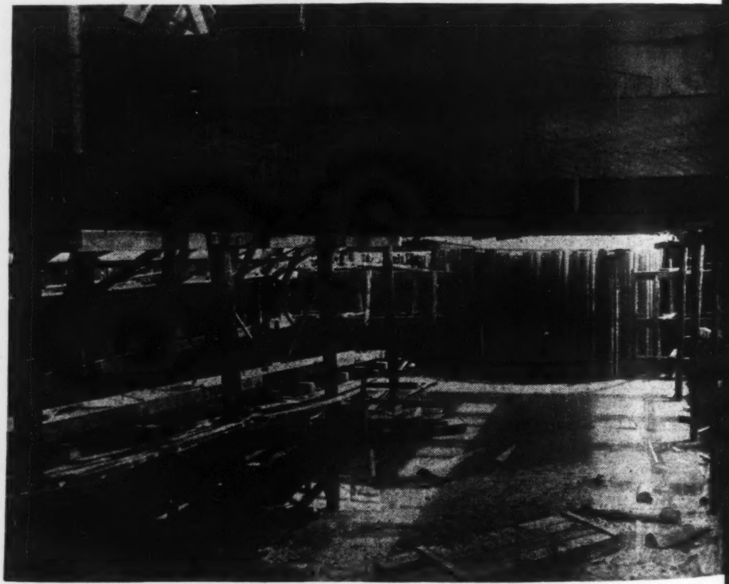
As each of the dock sections was completed, it was delivered to a commercial towing company for transport down the Ohio and Mississippi Rivers to the Gulf. Bridge clearances and channel depths limited the height of the superstructure and the total load that could be placed prior to the journey. An open barge carried some equipment to be installed reaching waters of unrestricted d

Following usual inland water practice, the drydock sections pushed instead of towed down river. Moulded ends of the d sections and the fact that the docks must ride quite high in water in the 9 to 10-ft. deep cha made direct pushing by tow b difficult as the usual towing-knees the tugs are not high enough for service. The method adopted for 80-ft. wide battleship dock sec was to tie a 28-ft. wide barge alo side the drydock sections and h the towboat push on the barge. T assembly had a total width of 10 about the maximum possible to p locks of 110-ft. width. Delivery to Gulf was made without incident.

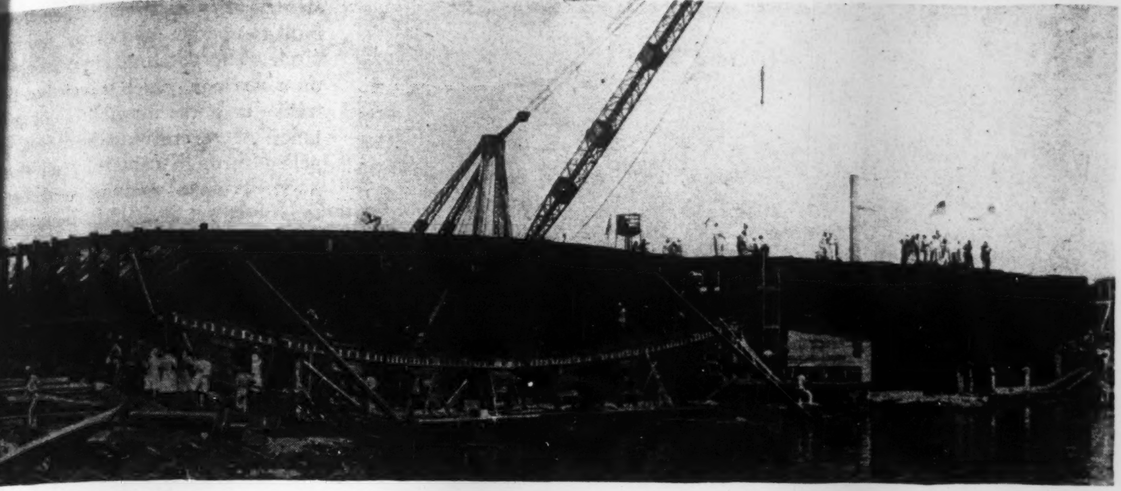
STEEL AND TIMBER DRYDOCKS AT MOBILE

Experience of the job supervisory forces in designing and building steel structures led to the adoption of steel fabricator's practices of detailed planning and accurate fabrication for timber drydocks at Mobile, Ala. The first unit built, a 16,000-ton Rennie type drydock, has seven 77x120-ft. and 18-ft. deep pontoon sections of timber that were built separately and after launching were joined by continuous wingwalls of steel. Several small timber docks were built, ft. long and 64 ft. wide and 1,000- lifting capacity. Also, a number all-steel docks, 200 ft long by 64 wide were constructed. Doullut a Ewin, Gulf Coast dock and mar structure builders, were the co tractors.

Analysis of the timber drydo design, which required heavy trus and had some complications at wat tight bulkheads, indicated that fra



Outshore ways were completed inside a cofferdam braced only above water lev Cofferdam was flooded and the outshore-end removed, then a barge was broug under the truss and pumped out to raise the truss off the supports for floati to the next cofferdam location.



ssembled trusses weighing 15 tons each were erected on pile supported ways for pontoons of the 16,000-ton drydock.

would be greatly simplified and mbly speeded by detailing each e of timber just as is done in steel struction. This detailing included cing of all holes and, for the 00-ton timber docks, the position- of ring connectors and shear tes.

At some connection points the tim- framing for the drydocks was rly 3 ft. thick with as many as en pieces of timber coming to- ther at a single joint. Very accu- e detailing was necessary on these nts to get all connectors and bolts fit precut members. First step in struction was cutting and marking urate templates from sheets of sed wood for each piece of tim- in each truss. Following steel ication practice, these were laid accurately in a mold-loft and, n all had been cut, templates of a truss were assembled on the r to check the matching of ends bolt holes. Holes just large ugh to accommodate a center ch were bored through the tem- e at indicated points.

After the accuracy of the assembly been established, the templates e used to mark timbers for the , the templates being tacked to timbers for making the necessary . Punches were used at the bolt es to mark the spot into which auger point was to be started.

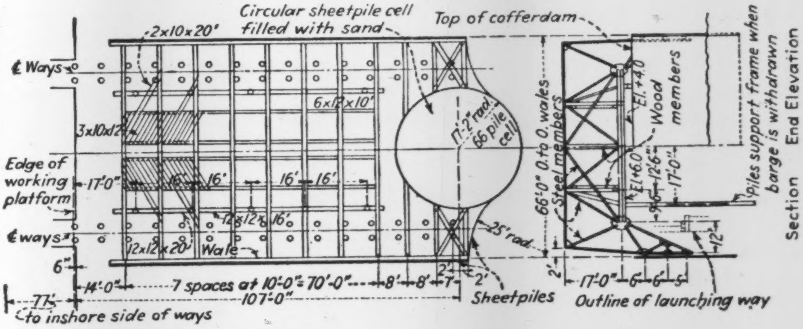
Improvised timber mill

Special milling equipment could t be obtained when needed so an genious foreman developed and ilt a saw mill and boring mill from what second-hand material could be found. Worthy of special note were two large boring machines used to provide about 3 ft. of vertical auger penetration. Shafts were made of pipe and the bearings were pipe couplings. For smaller boring jobs, such as the splice blocks and fillers, an ordinary hand-held type pneumatic drill was mounted on a counterweighted pipe frame arm so that it would travel in a true vertical plane. Grooves for connector rings were cut with air-driven tools. A blade added to the cutter head made a slight chamfer and freed the edges of chips so that the rings could be started easily into the grooves.

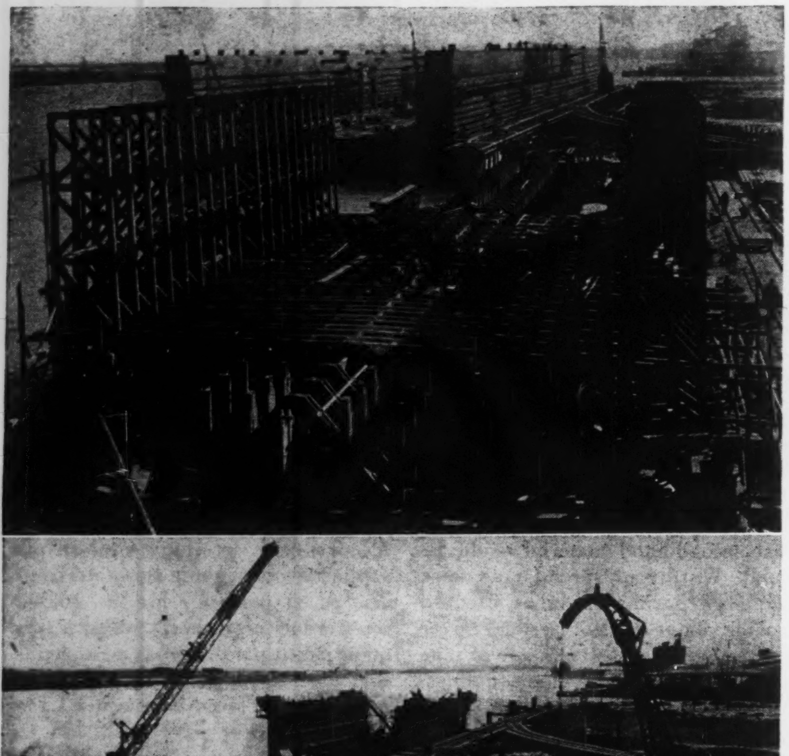
Arch trusses for the pontoons of the 16,000-ton dock were built by prefabricating and assembling frames complete for the full width of the vessel. Assembly was done on a timber platform into which large pipe pins were set to make the curve of the chords.

Pontoon sections for all of the floating drydocks were built level on pile supported ways along the waterfront. The seven pontoons for the 16,000-ton drydock were built two at a time on adjacent parallel ways arranged so that the 120-ft. width of the individual sections faced the water. Two additional ways were built for the small timber docks, each with five side-launching cradles. After the seven pontoons of the large dock were completed, some of the timber docks, and later the steel ones, were constructed on the original ways.

The outshore end of the ground ways required a cofferdam for accurate underwater framing, and here an ingenious method of construction saved time and money. A steel truss was designed to brace a single line of sheetpiles around the cofferdam thus eliminating the timber framing usually required. Trusses were so designed that they were above the permanent ways, and were framed to be floated into position on a barge, then the barge lowered by admitting water,


Circular sheetpile cell filled with sand
Top of cofferdam
2x10x20'
℄ Ways
6x12x10'
3x10x12
17'-2" rad. 66 pile cell
Edge of working platform
17'-0"
16'
16'
16'
16'
12x12x16'
℄ ways
12x12x20'
Wale
25' rad.
6"
14'-0"
7 spaces at 10'-0" = 70'-0"
8'
8'
7'
2'
2'
107'-0"
77'
to inshore side of ways
Sheetpiles
66'-0" O. to O. wales
Steel members
El. +4.0
Wood members
El. +6.0
9'-6"
12'-6"
17'-0"
2'
17'-0"
6'
6'
5'
12'
Outline of launching way
Piles support frame when barge is withdrawn
Section
End Elevation

Cofferdam for construction of outshore ways was built with a steel and wood truss frame floated from one location to another to brace the walls.



Combinations of wood and steel characterizes construction of drydocks by Doullut & Ewin at Mobile. Frames for the 1,000-ton all-timber unit in the foreground were completely preassembled except for a few pieces at the center bulkhead. In the background is a wood-pontoon, continuous steel wingwall 16,000-ton Rennie-type drydock. Below are 1,000-ton steel units built at the same location.

thus bringing the truss down to a support on timber piles while the barge was floated out of the cofferdam area. Next, a circular sheetpile cell was driven at the outshore center of the cofferdam with Y piles at selected points on the cell for connection from it to the side walls. The circular cell was filled with sand to make it self-sustaining.

The cofferdams thus constructed were 66x109 ft., and inclosed two sliding ways of the total of sixteen required. Water at the outshore end was about 20 ft. deep at high tide, but after closure, with sheetpiles driven into an impervious strata, it was easily pumped out.

After the outshore ways were completed the cofferdam was flooded, the circular cell and connecting piling removed, the barge brought back under the truss framing and pumped out to raise the trusses from the temporary supports. The entire unit was then moved to the next position.

Rail-mounted barge derrick

Erection ways for two of the big pontoon sections were served by a stiff-leg derrick of the barge type, with main legs rather close together and auxiliary legs just back of the mast to take side stresses. To enable this rig to service the entire area and make more than its usual 180 deg. swing, it was mounted on rollers built to operate on a closed rail roller circle. The rotating rig was erected on a carriage, which traveled on three tracks and was movable along a distance of several hundred feet, propelled through cables by an electric hoist. Truss assemblies weighing 15 tons were set at a 95-ft. boom radius with this rig.

Small timber docks

Assembly of the 1,000-ton timber docks was handled by locomotive cranes operating on rails along the shore side of the ways. Frames were prefabricated and assembled on shore, but somewhat differently than was done at other yards constructing similar drydocks. The center section at the longitudinal bulkhead was assembled on the ways with the keelson, and framing immediately adjacent to the center was placed one piece at a time. Except for these few pieces, the complete frames, including the vertical trusses of the wingwalls, were assembled and erected in one unit. Power tools—air-drills, spike drivers and the like—were used in decking and sheathing the floating drydocks, thus reducing the amount of hand labor required.

1,000 tons steel decks

Plates and shapes for the 1,000-ton steel docks were fabricated by Ingalls Iron Works at Birmingham, Ala., and Verona, Pa. Material was assembled into the largest pieces that could economically be shipped by rail. Pontoon frames for one-half the width of the dock were set in one piece against the center water-tight bulkhead. Next, frames were set to the "B" deck and, after the side shell and deck plating were added, frames were continued to the top, followed by completion of the outside plating.

All welding on the docks was done manually. Before any continuous welding was undertaken, all of the center section cross-frames were assembled, fitted up and tack-welded in proper position. Tacking was kept to a minimum, with welds light enough that they would break under the stress of shrinkage. Welding was then carried on symmetrically in all directions from the center of the dock so that shrinkage due to heating of the plates was kept uniform and no stresses "locked up."

SINS ADAPTABLE TO VARIED CONSTRUCTION

daptability of building basins ifferent sizes of drydocks is illus- d by construction at the Pollock- kton Shipbuilding Co. at Stock- Calif. The plant is on the 33- deep Stockton Ship Channel and e 88 miles from the Golden Gate ance to the sea at San Francisco. eral sections of the so-called bat- ip and cruiser drydocks were t at the yard, followed by con- ction of two of the 118-ft. wide e-piece drydocks, self-docking by able end sections. Basins de- ed for building the narrow units e readily converted to accommo- e the wider docks.

Wingwalls erected vertical

Existing steel plants, some as far y as Los Angeles, did nearly all the fabrication and preassembly o maximum sizes that could be ipped by rail. The fabricated steel s assembled on platens at the head the basins into the largest units t could be handled conveniently large shipyard cranes. The fold- g wingwalls were erected in verti- l positions and the drydock section ated to an outfitting dock for com- tion of the mechanical installation d lowering of the wingwalls by king.

The yard had two basins, simple agline excavations dug to about 25 t. below the surrounding ground and originally about 100 ft. wide by 580 ft. long to accommodate construction of two dock sections. The bottom was about 18 ft. below high water and the basin had a 11-ft. clear depth at low water. Piles were necessary to support the drydocks during construction and to carry the trestle for high shipyard cranes. The soil was ideally suited to the basin type of construction yard as little water percolated through it. The banks stood on a 1:1 or steeper slope without protection.

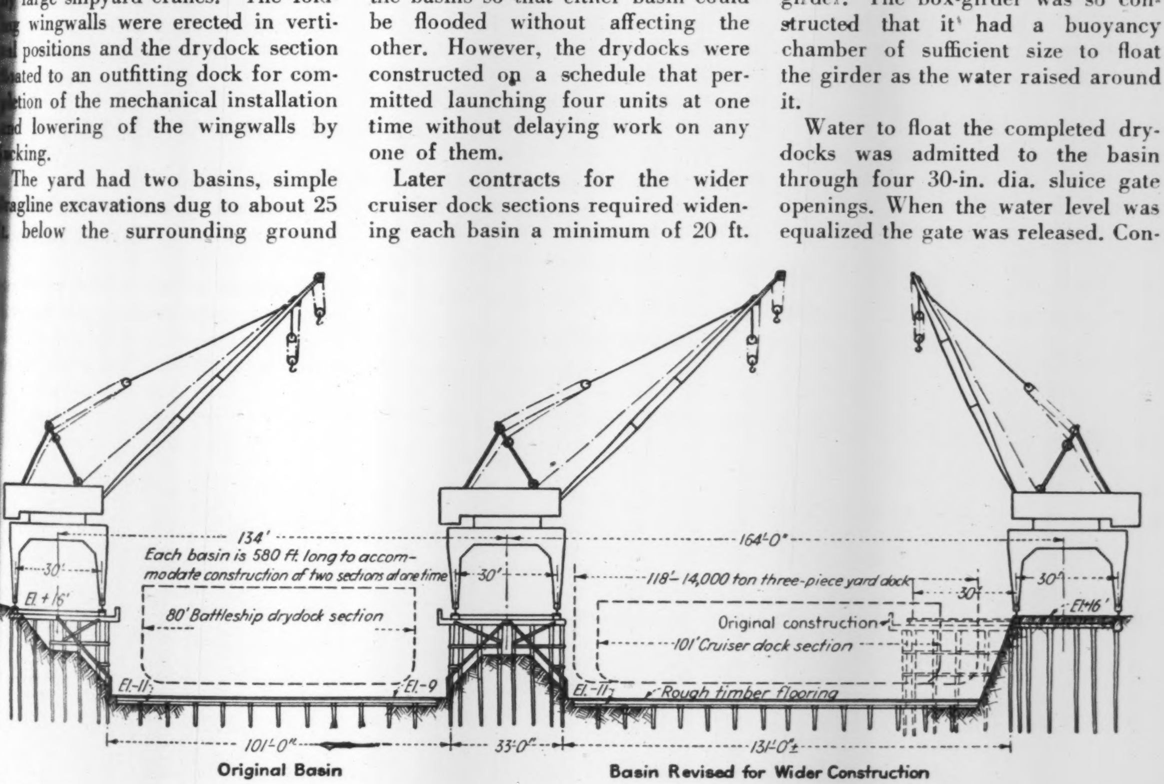
The basins were serviced by 45-ton capacity at 45-ft. radius full-revolving cranes on high gantries. One crane operated on a trestle between the two basins and one along the outside of each basin. The basins were partially separated by a longitudinal berm left between them at the center gantry position. This berm was left to stiffen the gantry trestle and did not come to high-tide level. Originally it was planned to drive a wood sheetpile bulkhead along its top to separate the basins so that either basin could be flooded without affecting the other. However, the drydocks were constructed on a schedule that permitted launching four units at one time without delaying work on any one of them.

Later contracts for the wider cruiser dock sections required widening each basin a minimum of 20 ft. Actual widening was made about 30 ft. to take advantage of leaving one rail of the 30-ft. gage gantry track in position and moving what was formerly the inside rail to outside position, thus requiring driving of only one new set of supports. Increasing the width by 30 ft. proved very advantageous when construction of 118-ft. wide drydocks of the three-piece type was undertaken as the basins could be quickly revised to accommodate them.

Floating girder at 110-ft. gate

Original plan for the basin was to leave a berm across the outshore end and excavate it when the drydocks were ready to be floated out. When additional units were contracted at this yard, the plan was modified by building a gate inside the berm, then removing the earth dike before the first vessels were ready for launching. The outlet gate was a 110-ft. long wood structure of 10x10-in. timbers set vertical and caulked watertight against a differential head of 17 ft. Thrust at the bottom was taken against a concrete sill. Near the top the thrust was resisted by a watertight steel box-girder. The box-girder was so constructed that it had a buoyancy chamber of sufficient size to float the girder as the water raised around it.

Water to float the completed drydocks was admitted to the basin through four 30-in. dia. sluice gate openings. When the water level was equalized the gate was released. Con-


134'
164'-0"
Each basin is 580 ft. long to accommodate construction of two sections at one time
30'
El.+16'
80' Battleship drydock section
30'
118'-14,000 ton three-piece yard dock
30'
30'
El.+16'
Original construction
101' Cruiser dock section
El.-11
El.-9
El.-11
Rough timber flooring
101'-0"
33'-0"
131'-0"±
Original Basin
Basin Revised for Wider Construction

he basins at the Pollock-Stockton yard were constructed for drydock units 80 ft. wide, widened to accommodate a 01-ft. unit and finally a drydock 118 ft. wide without extensive changes.

crete counterweights at the top forced it to swing outward and down on hinges to lie flat for the drydocks to float over it. The girder at the top, with no thrust against it, and floated by the water, was towed out of the way.

After the four drydock sections built at one time were moved out of the basin, the structural girder was floated back, the gate raised by the shipyard cranes and swung shut at low tide. Incoming tide produced a differential head, pushing the timbers against molded rubber seals and thus quickly stopping leakage.

Assembly at head of basins

Fabricated parts came to the construction yard by rail, moving to assembly platens just landward from the basin. Here very large assemblies were made up where they could be reached by the cranes serving the basin, for turning and for carrying to the assembly point when complete. Assemblies ranged in size up to 80-ton units, complete even to scaffolding already hung for convenience of welders and for subsequent painting. Adequate storage was available near the yard so there was no congestion of either new material or assembled parts. Large parts were planned, however, so that they were ready for immediate placing when needed. Thus, handling was reduced to a minimum and high lifts over previously erected sections were avoided.

Assembly in the basin started with bottom plates of the buoyancy chambers followed by assembled K-shape trusses for the watertight compartments, side-shells with serrated stiffeners attached, bow and stern assemblies and finally the deck. Wingwalls were erected in "up" or working position while the drydock sections were in the basins. This was desirable as the preassemblies were in such large units that two cranes were required to handle them. Erection of the wingwalls in vertical position was preferred to assure accurate assembly for connection to other sections. The wingwalls were let down to towing position after the dock sections were tested.

Welding, both on the assembly platens and in the erection basins, was done by machine for nearly all of the flatwork. However, the use of large preassemblies reduced the welding required in the basins to a minor amount. An example of the progressively larger assemblies devised at this yard to reduce erection time was the wingwalls. At first these were erected in 78 pieces but this was reduced to 23 crane lifts for a 440-ton wingwall, an average of almost 20 tons per unit.

Model aids planning and building

Preassembly into large units introduced some unusual planning problems. To assure getting all of the parts into proper position without introducing subsequent difficulties in assembly, a scale model of a drydo section was built of wood in t mold loft, framed exactly as the pr assemblies were planned. This mod was very helpful in planning and r vising assembly procedures and fu as useful in instructing shipfitters a riggers in the work to be done. Ea part of the model was built exact to scale and made so that it cou be taken apart and reassembled, plan and demonstrate procedures.

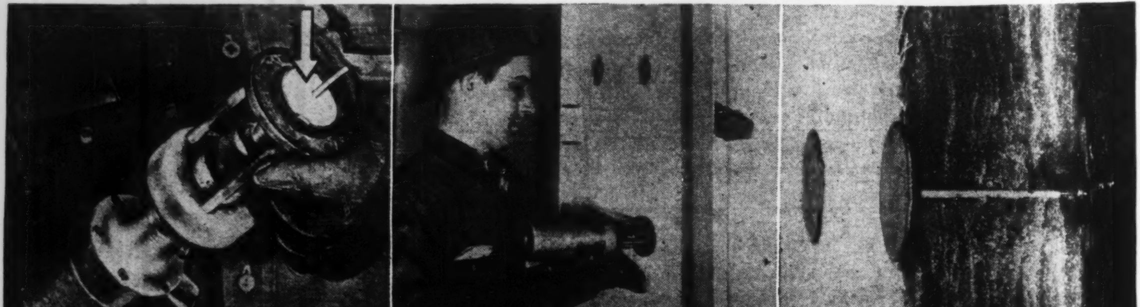
The model also was used in indo trination classes to show new e ployees what was being constructe and how each of the several par must come together at schedule tim to prevent delay on related part It has thus been a morale builde and expediter as well as assisting i the planning.

Outfitting followed more or les usual ship construction procedure. long wharf accommodated four dry dock sections at one time and sup ported a big full-revolving gantry crane, secured second hand from Caddoa Dam. Some of the machinery was placed while the drydocks were in the building basin, the amount of outfitting there depending on time available until the four dock sections under construction at one time were ready for simultaneous launching.

SMALL DRYDOCKS BUILT ON MISSISSIPPI

Quincy Barge Builders, made up of the construction firm of Bates & Rogers and two structural steel fabricators and erectors—Mississippi Structural Steel Co. and Stupp Bros. Bridge & Iron Co.—built several one-piece steel drydocks of 1,000-ton lifting capacity. Construction was carried out at Quincy, Ill., on the Mississippi River, near the fabrication plants at Decatur, Ill., and St. Louis, Mo.

Operation of the Quincy yard was planned to take advantage of the construction experience of Bates & Rogers in the installation of ways and facili



In outfitting floating drydocks, fibrous glass board was used to insulate against heat and cold. A large-headed fastener was spot welded to the ship plating by the special arc stud-welding gun.

s and direction of the field work, ile the fabricating shops and erec- n crews of the steel companies sup- ied and handled the steel.

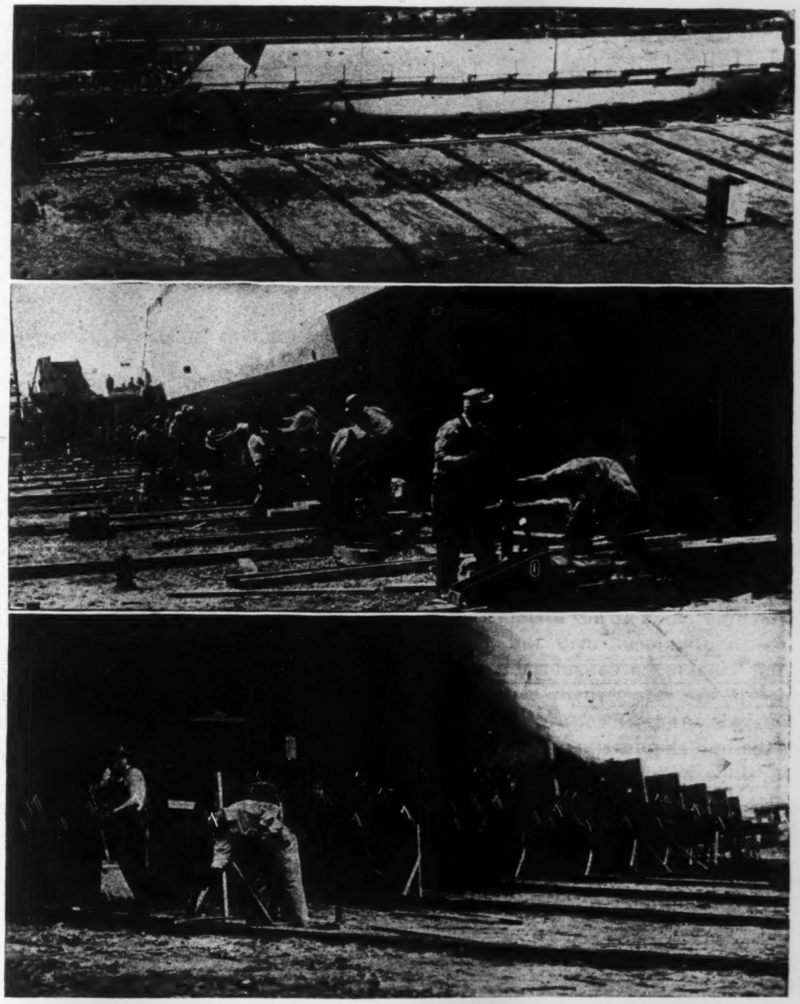
The yard originally was laid out r simultaneous assembly of nine 5-ft. long LCT's along the water- ont, with five assembly ways back f them for starting construction on me units. For the 240-ft. long dry- cks, the layout was changed to ree sets of building ways with even ground ways in each. The ilding ways were on level ground d the hull, after completion, was oved forward and tipped over an brupt angle on the ground to slide to the water.

Ground ways for constructing and unching the drydocks were at 16- t. c. to c. to come under alternate rames of the hull. The ground ways ere 8x8-in. H-beams, reinforced nd widened by timbers to about 12 n., and were supported on 3x12-in. ud sills 4 ft. long, laid continuous. The hull was assembled on cribbing aid on the ground ways and at in- ermediate points between the ways o support each frame of the dry- lock. Standard-gage track was laid n both sides of the assembly area for delivery of material and move- ment of locomotive cranes to service the erection. Track on the riverward side was made movable.

Delivered ready for assembly

No pre-assembly was done at the site. Fabrication and assembly into the largest units that could be shipped was done at the established shops of the contractors where equipment and experienced personnel were available. Built-up sections came to the job either by truck or rail. Truck delivery could be made in a few hours from the fabricating plants and the job was so located that railroad shipments could leave the fabricators by four in the afternoon and be at the assembly site ready for unloading at nine the next morning.

All parts and plates were delivered with edges bevel cut and ready for immediate installation in the hulls. Plates for the bottom, mostly in rolling mill sizes but shaped and trimmed, were laid down and welded. Next, pre-assembled frames were set from the longitudinal bulkhead on the center line to under the inner wall of the wing where an extension of the wall separates the pontoon into an additional compartment. The wing-wall frame to the "B" or safety deck was placed and interior bulkheads and exterior shell plating attached and welded. The bow and stern pieces were the heaviest single assemblies handled; a 12-ton section from the bow to the first frame was shipped in one piece and attached in the field to the section extending to the second frame before final assembly.



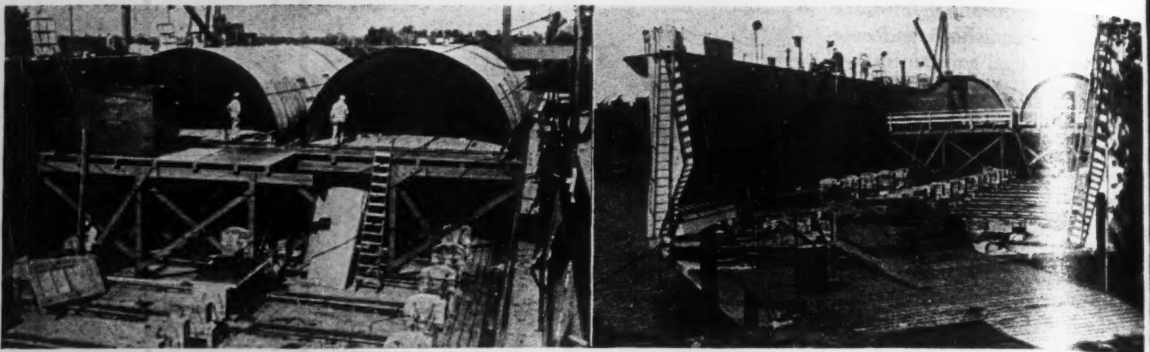
Quincy Barge Builders assembled the hulls on level ground and jacked them out to the edge of the bank. Each of the eleven skids was carefully aligned, lower picture, before the hull was tipped over the break-point in launching.

Quincy Barge Builders took advantage of the Bureau of Yards and Docks' design, which located all machinery above the "B" or safety deck, by building only up to the "B" deck before launching. Thus, only valves for controlling the flooding and unwatering had to be placed while the vessel was on the ways, saving all the slow work of setting machines for accomplishment while outfitting.

After assembly was complete to a point where launching could be done, the hull was painted and hydraulic jacks used to lift the dock and release the cribbing, then lower the dock 15 in. to the sliding ways. The sliding ways, used at each of the eleven ground ways, were a 14x14-in. timber, topped by a 12-in. timber cut to cradle the hull.

Launching was different

Launching at Quincy was accomplished by the unusual method of tipping the vessel from level ground ways to 2-in. per ft. declivity launching skids. Never before used for vessels of this size and involving several untried operations, it required courage, and some persuasion, on the



Quonset huts were built to provide quarters in transit. One hut serves the 22 man crew for sleeping and the other as galley and mess. Unit refrigerator is set near galley.

part of the construction-trained job superintendent to get the idea approved for use.

There was some doubt as to whether the forward end of the sliding ways might come down on the launching skids at all, a slight variation in alignment over the "breakpoint" making a considerable difference in the direction of the ends of the skids. And, of course, if one end of the hull should start moving down the skids even a little ahead of the other, it would bind and might cause any number of unforseeable troubles. None of the anticipated difficulties were experienced, probably because every precaution was taken to prevent them.

The hull, lowered to support on the eleven ground ways, was moved riverward by hand-operated jacks at each ground way. Mechanical jacks were used to start the load uniformly, then hydraulic jacks substituted to speed the moving operation. When the point of tipping to the launching skids was reached, mechanical jacks again were used to exactly align the drydock and push it uniformly to the tilting point as the launching ceremonies came to a climax. Jacking the vessel out 22 ft., plus half its 64-ft. width, to a tipping position required about 30 hours.

The drydock was taken to an outfitting pier, 20 ft. wide and 230 ft. long, built on six-pile bents at 12-ft. centers and carrying a standard-gage railroad track and decked with heavy timbers to permit passage of crawler cranes and trucks. The 13-ft. high section of wingwalls above the safety deck, completely pre-assembled in 18 to 26-ft. long units, were set in place and tack welded for the near side of the drydock, then the hull turned around to bring the other wall near the pier where the crane could set additional units. The top or weather deck of the wall was left off to permit later setting of heavy machinery.

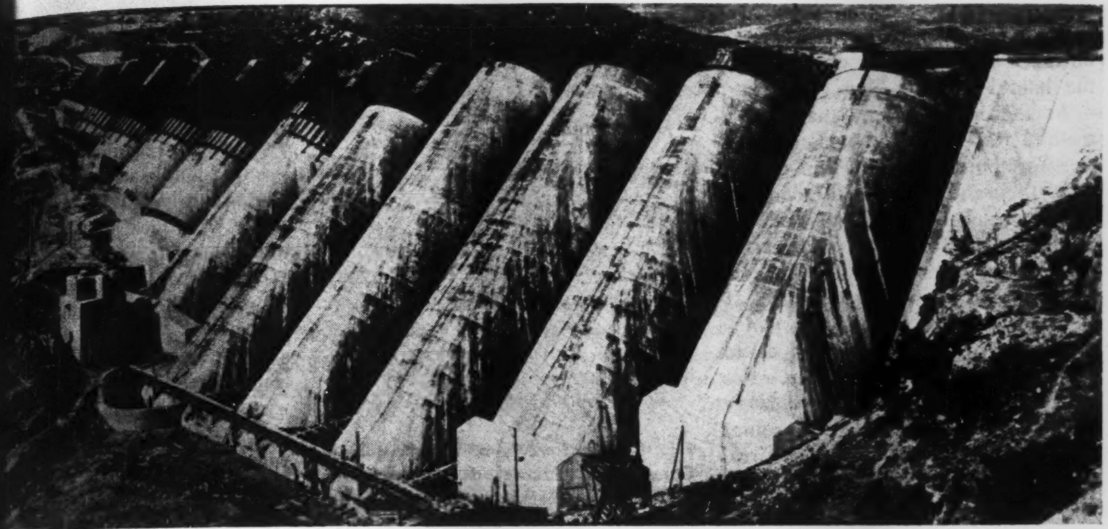
Outfitting was delayed by slow delivery of parts so Quincy Barge Builders acquired a fairly well-equipped machine shop and made parts, repairs and experimental items they could not get. This firm even manufactured parts for some other yards building similar drydocks.

For construction of timber and steel floating drydocks at Jacksonville, Fla., George B. Auchter Co. utilized basins dug in the sand. The seaward end of the basins was opened for "launching" by dredging out a berm. When space for additional basins on the waterfront was not available drydocks were built inland and, after partial completion, a channel was dug to the water-side basin (ENR March 8, vol. p. 329).

Take war to Japan

In carrying out the huge program of construction of floating drydocks, naval and civilian personnel of the Bureau of Yards and Docks and the designers and construction men associated with them have made a most worthy contribution to prosecution of the war. In addition to producing new types of drydocks these men have devised new facilities and advanced the technique of drydocking naval vessels to the extent that naval strategy has been revised to a mobile plan, even for naval bases.

Space does not permit naming all the personnel who have contributed to this achievement. Those who have participated in the work however may take great satisfaction in having quickly produced some of the major facilities for taking the war to Japan's front door.



1. Raising Beni-Bahdel Dam above its designed height was made possible by counterbalancing induced stresses.

Prestressed Concrete Design Overseas

Henri Marcus
Washington, D. C.

***ntents in Brief**—European engineers have made considerable progress yond the stage of development in this country in the practical application concrete of artificially induced stresses. Edouard Freyssinet, noted French gineer, has been an outstanding practitioner of the art, and other French, itish and German engineers have followed suit. Long-span beams, slender ch bridges, pipes and piles, and water-tight caissons have been prestressed improve structural properties and conserve steel.*

THE YEARS immediately before the ar, some intricate problems were en- ntered by French and other ropean engineers in connection th the design and construction of crete structures. The manner in ch some of these problems were lved by the use of the principle prestressing is considerably dif- ent from current practice in this ntry, and since the results may be interest to American engineers and struction men, the writer, at the gestion of the editor, has recorded this article such of these as are iliar to him.

Normally, the design of a rein- ced concrete structure is based stresses resulting from its own ght, live load, variation of tem- ature, shrinkage and settlement. e ratio of the most unfavorable combinations of the strains and stresses induced by these natural forces to the critical rupture strain or stress determines the bearing capacity of the structure. This ratio, and therefore also the efficiency of the structure, can be improved by adding to the natural forces a group of artificially produced external forces, which are of such direction and magnitude, that the artificial stresses counterbalance the natural stresses to the extent desired.

One practical method for strengthening concrete construction by artificially-induced stresses was originated by the French engineer Edouard Freyssinet, and considerably developed in France. An example of the application of this method is the Beni-Bahdel Dam in North Africa, completed in 1939.

As shown in Fig. 1, the dam is composed of a series of semi-circular concrete shells, each having a span of 66 ft. Although designed for a head of 178 ft., its height was changed to 200 ft. during construction by order of the public works agency of the Algerian government. In order to relieve the existing buttresses and the abutments of the arches of the additional water pressure, Freyssinet suggested the use of artificially induced stresses. The method used is illustrated in Fig. 2.

Between the downstream face of the

ABOUT THE AUTHOR

Serving as chief engineer or consultant on major public works throughout Europe and North Africa, Henri Marcus, graduate of the Charlottenburg Insitute of Technology, Germany, 1908, gained first-hand knowledge of the Freyssinet technique of prestressing concrete when he worked with Edouard Freyssinet in France just before World War II started. Mr. Marcus arrived in the United States in 1942 and now is a consultant for the Bureau of Yards and Docks, U. S. Navy.

jacks resting on the top flange. Finally, a lateral pressure was exerted on the webs by the screws tightening the lateral forms.

At the beginning of the war, a method was developed in Great Britain for the mass production of several thousand reinforced concrete beams, which had a length of 17 ft. 3 in., a depth of 20 in. and, at the supports, a width of 12 in. The constructor built a working platform, 41 ft. wide and 498 ft. long, on which nine rows of 28 girders each could be accomodated at one time. For the reinforcement of the lower flange of the 28 beams, a single 2-in. round cable composed of 29 hard-steel wires, about 500 ft. long, was used. Before pouring the concrete, this cable was stressed to 166,000 psi by means of hydraulic jacks acting on one side against strong metallic yokes holding the ends of the 20 wires, and on the other side against anchorage pillars of reinforced concrete.

Swelling of wires provides bond

After the concrete had hardened sufficiently to withstand a compressive stress of 1,250 psi., the tension in the cable was released, transmitting the stress to the concrete through the shortening and swelling wires. The lateral pressure on the concrete resulting from the swelling was, according to test, amply sufficient to provide an efficient bond without end anchorage.

In the above-described beams, the force exerted by the hydraulic jacks on the reinforcement was balanced by the reaction of auxiliary abutments supporting the jacks. Since these extra abutments, located outside of the structure, increase in cost with the magnitude of the prestress load, the expense involved in their construction can be justified only if the same abutments can be used for the fabrication of a number of identical members requiring moderate prestressing.

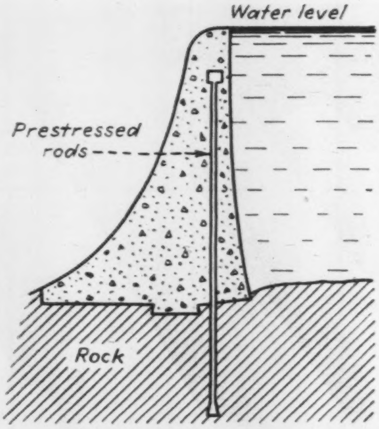


Fig. 4. The stability of a high dam in France was increased by anchoring prestressed steel bars in the foundation rock.

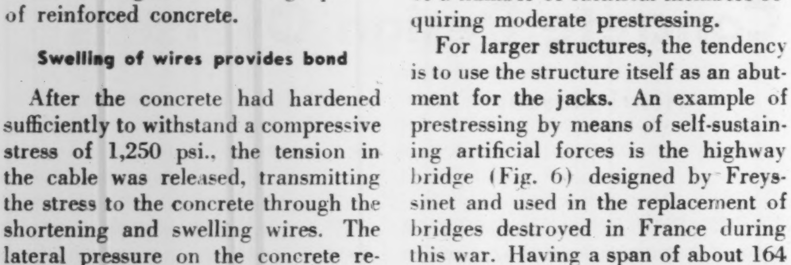


Fig. 5. A 60-ft. beam to be used for a weir in Oued Fodda, Algeria, being removed from a steel platform which was used in prestressing operation.

For larger structures, the tendency is to use the structure itself as an abutment for the jacks. An example of prestressing by means of self-sustaining artificial forces is the highway bridge (Fig. 6) designed by Freyssinet and used in the replacement of bridges destroyed in France during this war. Having a span of about 164 ft. and a width of 26 ft., the bridge consists of five reinforced concrete, I-beam girders, 6 ft. 7 in. deep, spaced 5 ft. 3 in. on centers. Each of the 3-ft. wide bottom flanges is reinforced at the center of the span by two groups of fifteen, 2-in. round cables, each composed of 18 wires, prestressed to 130,000 psi.

As the bending moment decreases and the shear increases, the cables are gradually bent upward toward the top flange of the girder. Before stressing, the cables are embedd the concrete only at one end distance sufficient to develop an age. At the other end they are by a pair of conical wedges special, double-acting jack, supp by the girder. While stretching cables, the jack presses against wedges, compressing the wires tween them so that there will slippage when the jack is di nected.

A test showed that a efficient self-anchorage of the str wires is realized in this way; bu order to increase bond resistance, wires, after prestressing, are fi connected to the girder concrete mortar. In design computations, ever, the reinforcement is assume act like a tie connecting only the of a bow-string and bond is negle

Other recent developmen

Another recently developed more economical solution uses t made of sheet metal or plastic m rial embedded in the girder conc like conventional reinforcement. ter the concrete has hardened, ca are slipped through the tubes stressed. Then, under air pres a special, very fluid grout is inje until the tubes are full. A furt advantage of this method is the p sibility of forming a girder of pre units which are assembled on a li scaffold and squeezed together by p stressed cables. The joints betw the units are shaped with respect the direction of the main stresses such a way that even under the wo loading conditions the compres stresses acting on the joints are gr enough to prevent slip. With the of a relatively moderate amount steel, tensile stresses in the conc are eliminated and the resulting str ture is superior to the conventio type of reinforced construction b technically and economically.

This type of construction was u by Freyssinet, when he designed 450-ft. beam span, consisting of ca tilever arms and a 260-ft. suspend span. In this project, hydraulic ja were inserted in the hinges in such position and adjusted to such a lo that the whole structure, althou very flat, acted as an arch with an e actly fitted curve of pressure.

The application of self-sustainin artificial forces was also used g buttresses B and a new abut- A, supported by rock, a rein- concrete strut S was inserted, own in the sectional view (Fig. y means of hydraulic jacks act- the joint J between the strut he abutment, the magnitude of rust exerted by the strut on the was regulated in such a way that sultant of the maximum water ure, the dead load, and the strut had the direction, position and itude provided for in the orig- dam footing. In the computation e thrust corresponding to this tion, the effect of eventual de- tion and settlement of the abut- A was taken into account.

e precompression of the strut ccomplished by means of several of hydraulic jacks with a total city of 20,000 tons for the high- buttresses. The lateral stability e buttresses was increased by four of cross struts precompressed 500-ton jacks, located as shown e right in Fig. 2.

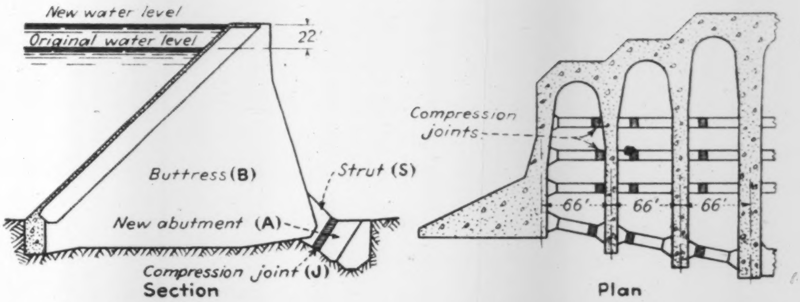


Fig. 2. Method of inducing stresses into Beni-Bahdel Dam to permit its height to be increased 22 ft. is here indicated. In the section at the left, jacks act through a strut and react against an auxiliary abutment. In the plan at the right is indicated how the lateral stability of the buttresses was increased by cross struts, prestressed by 4,500-ton jacks, located as shown by cross-hatching.

nother ingenious application

second example of a daring ap- tion of artificial forces is the at Hamiz, North Africa (Fig. a plain concrete structure orig- y designed for a head of 136 ft., h had to be raised to 200 ft. e the water supply was to be tained during the erection of the rstructure, a strengthening of the by thickening it on the upstream was not practicable. On the down- m side, reinforcement of the dation would have met great diffi- es. Therefore, Freyssinet sug- d that on the downstream side rch should be constructed with -backs against the rocky bank, that the forces acting on the new cture N (Fig. 3) should be trans- d by means of Freyssinet hinges n the upstream crown of the old and by means of reinforced con- e struts S on the extrados of the arch C. Inserted in the joint be- n the old dam and the new arch, eries of jacks J exerted sufficient e to bring the curve of pressure each structure into the desired tion and the existing dam was ved of the extra stress due to the ease in water pressure.

nother outstanding French engi- , Coyne, used a similar combina- of natural and artificial stresses. order to increase the stability of high dams, he connected them with the most resisting layers of the foundation by means of prestressed steel bars set near the upstream face and deeply anchored in the rock. The bars were prestressed to such an extent that the resulting pressure on the base of the dam was much greater than the maximum tension that could be produced by the water pressure. (See Fig. 4).

A similar device was applied by Freyssinet to counteract the stresses produced by buoyancy in the bottom slab of drydocks and sluices. He used prestressed bars to anchor the slab to the foundation with such efficiency that bending stresses were almost eliminated, and therefore the thickness of the slab could be reduced considerably.

Another combination of natural and artificial forces was applied by Freyssinet to arch bridges. By means of hydraulic jacks acting on a joint at the crown, he induced the thrust necessary to compensate for the effect of temperature variation, shrinkage, plastic flow and elastic shortening. In the U. S. this method was used for the construction of the Rogue River Bridge in Oregon (*ENR* Aug. 21, 1930, p. 290.)

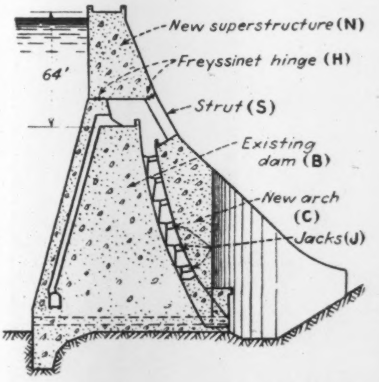


Fig. 3. A 64-ft. high addition to Hamiz Dam in Africa was made possible by stresses artificially induced by jacks reacting against an arch built just downstream to provide support for the front face of the addition.

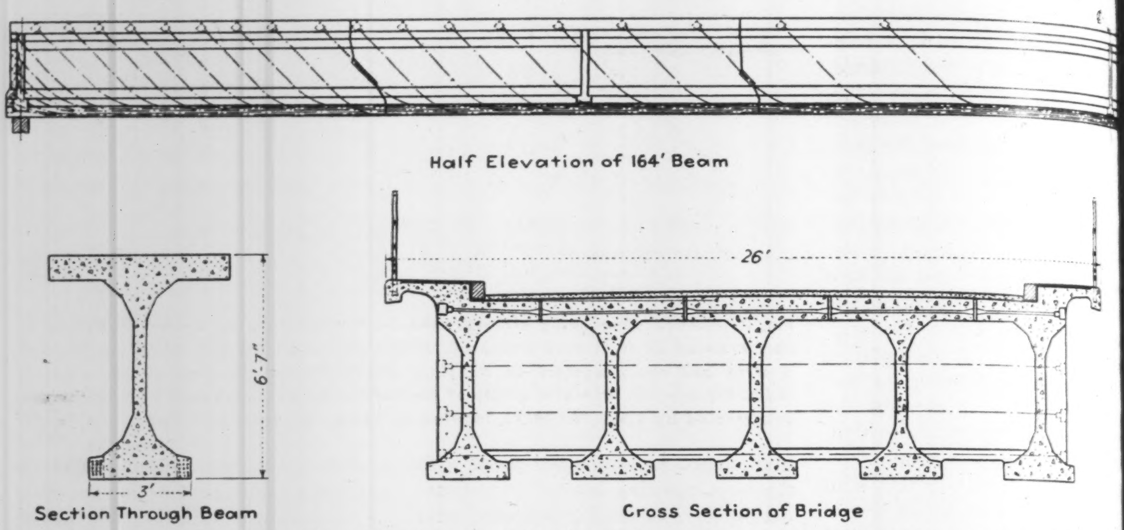
In Germany a similar device was suggested by Prof. Dischinger, who applied jacks to produce the desired tension in the horizontal ties connecting the skewbacks of bow-string arches.

To counteract dangerous tensile stresses in concrete, Freyssinet originated and developed a technique for precast masts, piles, pipes and beams. In particular, the construction of forms suitable for three dimensional precompression of newly-poured concrete and the use of vibration and heating have been so much improved in recent years that today prestressed pipes have, within two hours after the beginning of fabrication, a sufficient strength to withstand a test pressure far exceeding the prescribed water pressure.

Prestressed concrete beams

In France and Germany, T-beams of long span and great load-bearing capacity have been built using three dimensional precompression. An example of this type of member, a beam of about 60-ft. span used for a weir in Oued Fodda, Algeria, is shown in Fig. 5.

The main longitudinal reinforcement was fastened at one end to the heavy, steel platform that served as a form for the lower flange. At the other end the prestress load was applied by means of hydraulic jacks acting against the platform. Also, the stirrups were prestressed by vertical


Half Elevation of 164' Beam

Section Through Beam

Cross Section of Bridge

Fig. 6. Highway bridge designed by Freyssinet in which the girders were prestressed by means of self-sustaining, artificial forces; i.e., the girders served as suports for the jacks which stressed the reinforcement.

France to improve the water-tightness and tensile resistance of floating concrete structures. For the construction of wharfs of great depth, prestressed caissons were built in the form of a box with a length of 73 ft., a width of 45 to 50 ft., and a height of 50 ft. to 62 ft. One of these caissons, weighing about 3,700 long tons, before it was launched is shown in Fig. 7. The structure contained about 2,000 cu. yd. of concrete. It was reinforced at the bottom by a 60-ton steel frame and in the walls by 50 tons of conventional steel bars and 8 tons of prestressed wires of hard steel. High shear stresses corresponding to the worst support conditions of the huge caissons were efficiently countered by a small amount of prestressed wire properly placed.

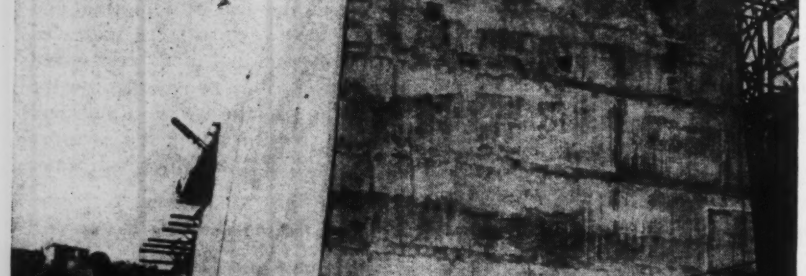


Fig. 7. Precast 3,700-ton caisson for a quay at Brest, ready to be launched. Some of its reinforcement was prestressed to improve impermeability and to decrease tensile stresses in the concrete.

In another caisson of almost the same size, the reinforcement was composed of hard steel wires prestressed by means of very small, flat jacks which, after the prestressing operation, were embedded in the concrete.

Trend of prestress design

In this article only a few examples of the various applications of prestressed structures are discussed. The construction of prestressed piles for heavy foundations, of large pipes for high pressures, and of great circular tanks is not described because they are familiar to U. S. designers.

The trend of prestressed concrete design indicates that the resulting improvement in structural properties of concrete yields a considerable saving of steel and produces an appreciable reduction in the cost of reinforced concrete structures:

1. If it is based on an adequate design, adjusting the prestressing forces exactly to the strain produced by the natural forces and utilizing to the utmost both the high compressive strength of concrete and the great tensile resistance of hard steel;
2. If adequate tubes are used for the easy manipulation of the reinforced cables and special grouts for their protection;
3. If hydraulic jacks, specially fabricated for rapid and intensive stressing and anchoring of the wires, are utilized.

VIEWING THE BUSINESS SIDE OF CONSTRUCTION

Construction Prospects At Home and Abroad

William V. McMenimen

General Manager, Raymond Concrete Pile Co.
and Chairman of the Executive Committee
Pacific Naval Air Base Contractors

ontents in Brief—*American construction men will have only a small part rebuilding Europe and will find limited postwar opportunity in South merica. After a brief lull following military victory they may expect in is country the greatest construction market ever envisioned, with oppor-nity for foreign work in the Pacific and Far East. These are the forecasts William V. McMenimen, expressed as he accepted the award for out-anding achievement in heavy construction made annually by the Moles, organization of construction men in New York City (ENR Feb. 15, 1945 l. p. 233). For the big construction program ahead Mr. McMenimen commends building up an adequate organization immediately, giving ecial attention to men now in the Seabees and Army Engineers.*

UCH HAS BEEN SAID about the owth of the construction industry d those of us who have spent a etime in it cannot help but be im-essed not only by the development the industry itself but also by the eady improvement in equipment to tch the new and ingenious methods the contractor. This development s enabled the industry to meet the ormous requirements caused by the r.

The expansion of the construction dustry together with the present de-easing volume of new construction ve developed a condition that is zzling many men. I find the fol-wing two questions asked wherever nstruction men gather together: hat is your opinion of the pros-cts for the future?" and "What ogram can we follow that will best uip us for the business to come ter reconversion?"

Let us consider the first question, hich is of utmost importance to all us. At the present time there is a cided reduction in the volume of nstruction and there is not much pe for an increase in business until e end of the European war. In fact, ring this period there will not be ough business to keep us all going. e must recognize that after the war Europe is ended there must be a riod of adjustment when everyone is considering how conversion can be quickly effected.

There will undoubtedly be a tremendous surplus of many kinds of materials and equipment. Some of this surplus can be used on work that can be started promptly, but the amount of work that can be started promptly is questionable. Planning boards throughout the nation have been studying new projects. Some projects are ready to start, but even well-planned projects may not reach the construction stage for some time after the close of the Japanese war. Even if they do, there will not be enough work to keep all of the construction men busy.

Eighteen months for reconversion

Industrial plants have been greatly expanded and it is unlikely that much new expansion can take place during the first year or year and a half after the end of the war. There are so many factors entering into conversion to peace-time methods that I do not believe I am unduly conservative when I state that this period of uncertainty may cover eighteen months or more.

The damage done abroad has been enormous and a tremendous rebuilding program in Europe must be started at once. There are many people in this country who insist that American contractors must do a large amount of this reconstruction. I agree that the United States will play a large part in reconstruction, but I do not believe that U. S. contractors will do a great amount of it. England, France and Italy are coming out of this war in an impoverished condition and will be confronted with the same problem that we face, that is, to provide job opportunities to their present war workers and their returning servicemen.

The need in Europe for materials and equipment will be great, and it is practically certain that we shall furnish a large portion of such products. While the cost of products probably will be paid through loans made by the U. S. government, the cost of the labor will be paid for in the currency of the country where the work is done. Under these circumstances it is only natural that the local contractors will do the work. I cannot picture foreign governments paying interest on money borrowed in the United States to pay profits to American contractors.

It may be true that there will be projects where the technical skill of our engineers will be required, but these services will be limited to a consulting capacity. The nationalistic spirit is too strong in England, France and other countries to invite American competitition; and even if this nationalism did not exist, economic factors would prevent the use, to any great extent, of American contractors.

In pre-war days some American contractors carried out projects in Greece, Poland and other European countries, but a study of these projects indicates the reason was that the Americans did the financing through American bankers, accepting only the projects that showed a good potential income.

There may be a few similar projects in Europe after the war, but the difficulty of financing them seems insurmountable unless it is done by the U. S. government. It has not been the practice of our government, in making loans to a foreign country, to specify that the work shall be done by American contractors, and I very much doubt that there will be any change in this practice.

I call attention to this because it has been said many times that our construction industry would have an opportunity to rebuild Europe. I do not believe that U. S. contractors can depend on European work during the reconversion period and therefore must look elsewhere for business.

South Americans have plans

South American countries during the war have accumulated a large amount of U. S. dollar credit because they have been unable to purchase various materials that they have urgently needed but which could not be released. As a result of this increase in credit and loans some South American countries have grandiose ideas regarding future development. At the same time most of these countries are developing a strong nationalistic spirit and are beginning to insist that local contractors do the work. It is true that at the present time U. S. firms are having success in obtaining contracts in South America, but a large part of this success is due to the fact that the contractors could obtain, or have had, the equipment necessary to carry on the work.

My visits to South America convince me that the local contractors are watching very carefully the methods used by constructors from this country. On account of the rapidly increasing cost of labor, South Americans undoubtedly will shift to the use of construction equipment largely obtained from the United States. Use of adequate equipment by local constructors may bring on competition so serious that it will make it practically impossible for U. S. contractors to take work on a profitable basis.

Firms operating in certain specialist fields will be able to operate successfully in South America for some years to come, but the ordinary construction contracts may be very difficult to obtain. It is safe to say, however, that the volume of business in South America will not be sufficient to employ the excess capacity of North American contractors during the period from now to the end of the war and during reconversion.

After the war there will be considerable work for American contractors in the Philippines, in the Dutch East Indies and perhaps later in China as the construction industry in these countries is not developed to the extent that it is in Europe. It can hardly be hoped that work in the Far East can be started promptly or even during the period of reconversion, which I have suggested would require perhaps a year and a half. There may be exceptional cases where American concerns that have investments in these Far Eastern countries will make an immediate start, but significant amounts of work will depend, to a great extent, on the time required to arrange financing.

I do not believe that I am unduly pessimistic in these statements, but we must face the facts. By so doing we can better answer the second question of interest to contractors, and that is, "What program can we follow that will best equip us for the business to come after reconversions?"

Construction boom coming

We are in a transition stage downward from the point where, in order to meet the demands of war, we enlarged our organizations beyond anything ever dreamed of before. We now face a sharp curtailment in business for an unknown period and therefore must make careful plans for carrying on during this period if we are to survive. I am still very "bullish" on the United States and believe that after the conversion period we will have one of the greatest booms we have had in the construction field. I would not dare to hazard a guess as to how long this boom will last.

The wise contractor is therefore going to accept the idea that for the next few years there will be only a moderate amount of construction work; that such work will be carried out under the keenest competition and that the income from construction will be small. My recommendation of procedure during this period may sound radical, but it is based on common sense.

Businessmen today are searching for investment of a kind that will retain its value and in future years will give a return equal to its present buying power. I have listened to many discussions of this problem and believe that the soundest investment contractors can make today is in building of an organization adequate and capable for postwar construction. Regardless of deflation or inflation, adequate personnel will return profits in dollars at the value of the dollar at the time the work is done.

Invest in personnel

The value of personnel cannot be overstressed. Records show that the life of the average contracting business is not long. Many outstanding firms have ceased to exist because of their failure to look ahead and strengthen their organizations for future work. We should study our enlarged wartime organizations and retain the best men we have. Where there is a weakness in our organizations we should be on a constant lookout for men with desired capabilities to strengthen our position.

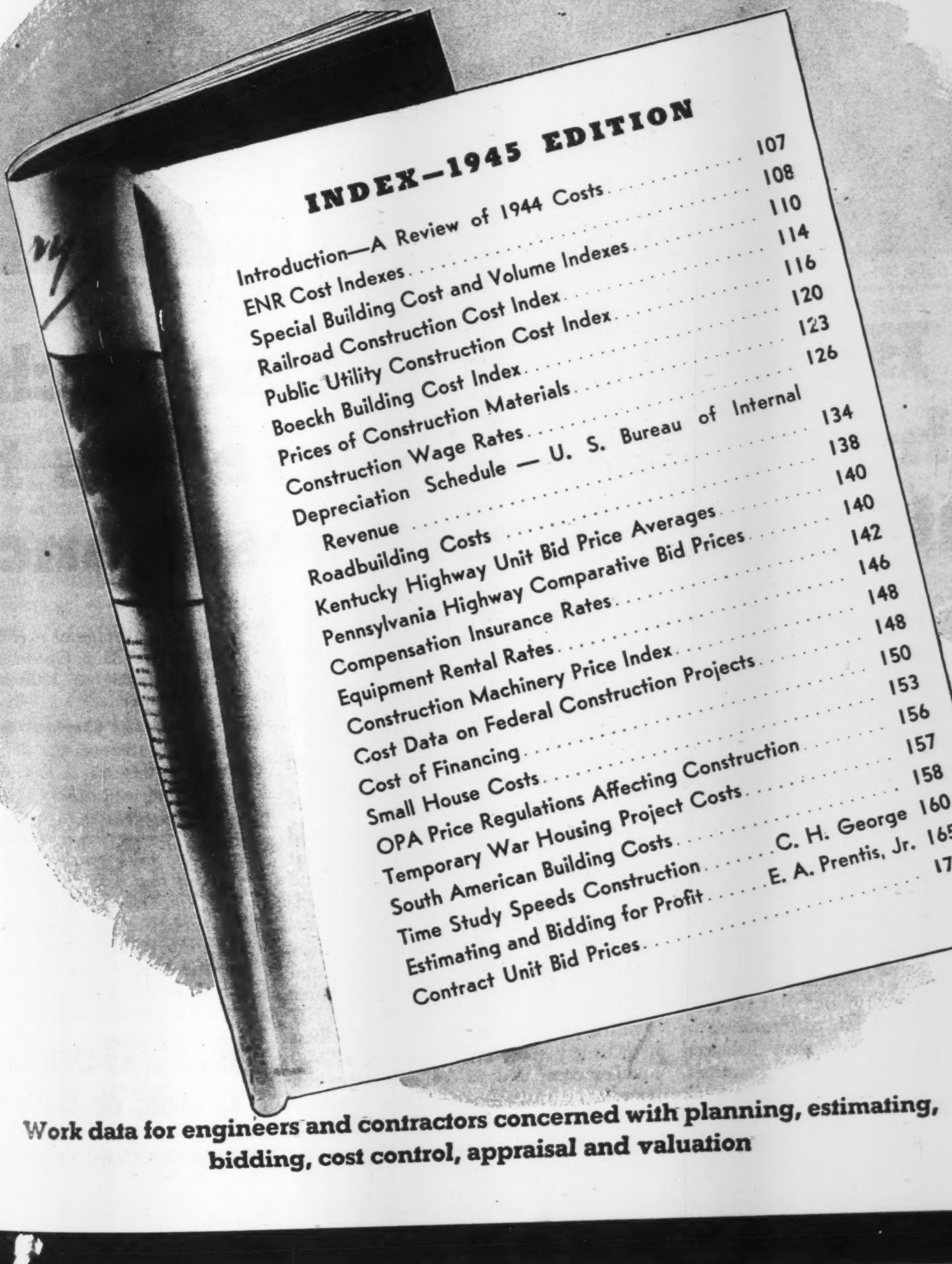
Men returning from the Army and Navy, and especially from the Army Engineers and the Seabees should be considered with particular interest. These men, who a year or two ago were considered too young to carry on large projects, have developed a confidence in themselves that they normally would attain only after many years of experience. They have been working under pressure and in trying conditions and know what to do to get results. I know of some of the work that the Seabees have been doing and am amazed at the results obtained. Many of us as contractors would be proud if we could obtain the same results in the same period of time. Some of these men are needed in our organizations.

I have recommended this acquisition of personnel as a pure investment. It is going to cost money because, during a period of very limited income, we will spend capital dollars to pay for idle time. The investment, however, will pay out when the big volume of business that I foresee for the future is at hand.

In closing I wish to add one warning. That is, avoid the old error of going into competition for work at cost to help pay the overhead. This has been the ruin of many contractors because taking work at cost usually means a terrific loss, and when this occurs the investment is wiped out and the business cannot continue.

ENGINEERING NEWS-RECORD

Construction COSTS



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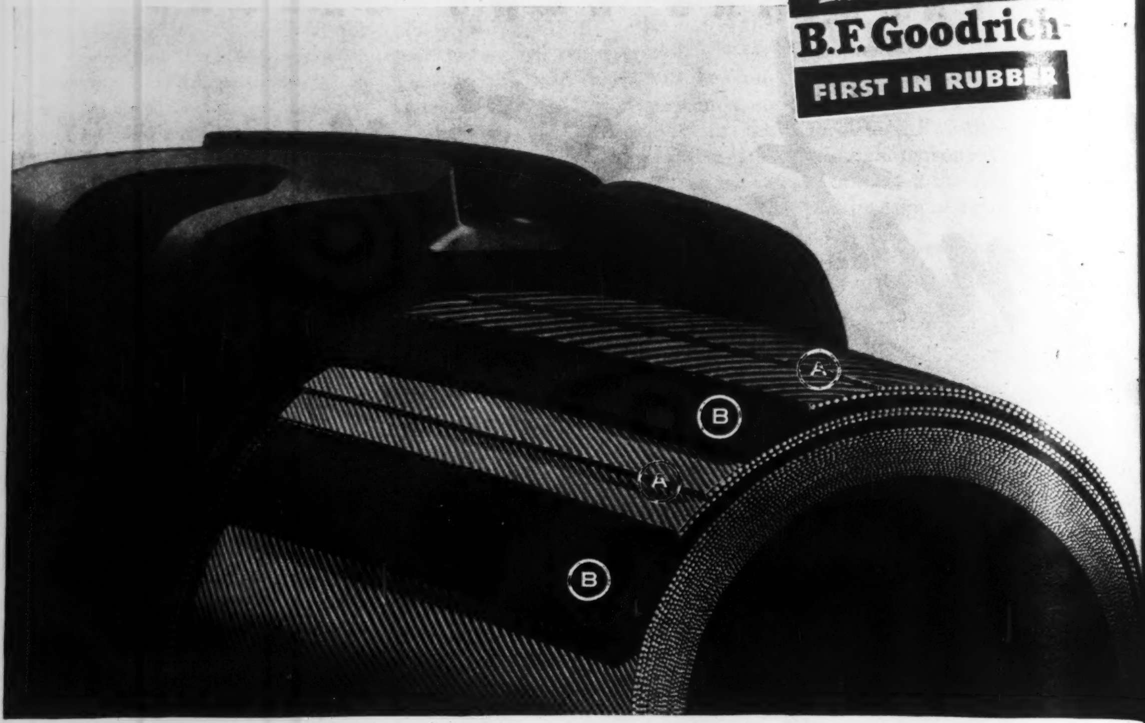
Work data for engineers and contractors concerned with planning, estimating, bidding, cost control, appraisal and valuation

In war or peace
B.F. Goodric
FIRST IN RUBB



How the B. F. Goodrich "shock shield" increases tir life and bruise resistance

OFF-THE-ROAD tires unavoidably hit rocks, ruts, and other obstructions under tons of impact. Those shocks bruise tires and often cause blow-outs, loss of time, costly repair bills, perhaps a ruined tire.

To give tires *and* tire users increased protection against such damage, B. F. Goodrich engineers developed a new tire construction principle . . . the *shock shield.*

Between the tread and the plies are *four* breakers, layers of rubber-coated rayon cords, insulated with thick cushions of shock-resisting rubber—the *shock shield.* These breakers are in pairs (see A), with the cords in each pair running parallel to each other—but with each pair running in opposite directions to give balanced strength. When the tire hits ruts, stones, etc., the cords in these breakers stretch together—not across each other—and return to their original positions. There is no friction between them, yet the force of the blow is *distributed*—not concentrated—and is absorbed by the insulating rubber cushions (see B). Thus, the shock passed on to the cord body of the tire is greatly reduced.

Users report results

Users of B. F. Goodrich off-the-road tires report they get fewer bruises, far less separation, better service, and longer wear—final proof of the soundness of BFG tire construction principles.

One operator reports 17,226 miles from B. F. Goodrich tires compared with 12,501 for the best of all three ordinary tires used; another, 15,107 miles compared to 11,304 for the best ordinary tire; still another, 17,599 miles compared to 6,476 for the best ordinary tire. A strip mine operator reports an average of over 4000 ho of service for B. F. Goodrich Univer tires compared to 1600 hours fr another make.

Make your own test

We urge every user of** off-the-ro **equipment to try B. F.** Goodrich ti **alongside of** other makes. Ke **accurate service** records. Compa **natural rubber tires** with natural rubb **synthetic with** synthetic, and prove **yourself that you can** save money w **B. F. Goodrich tires.

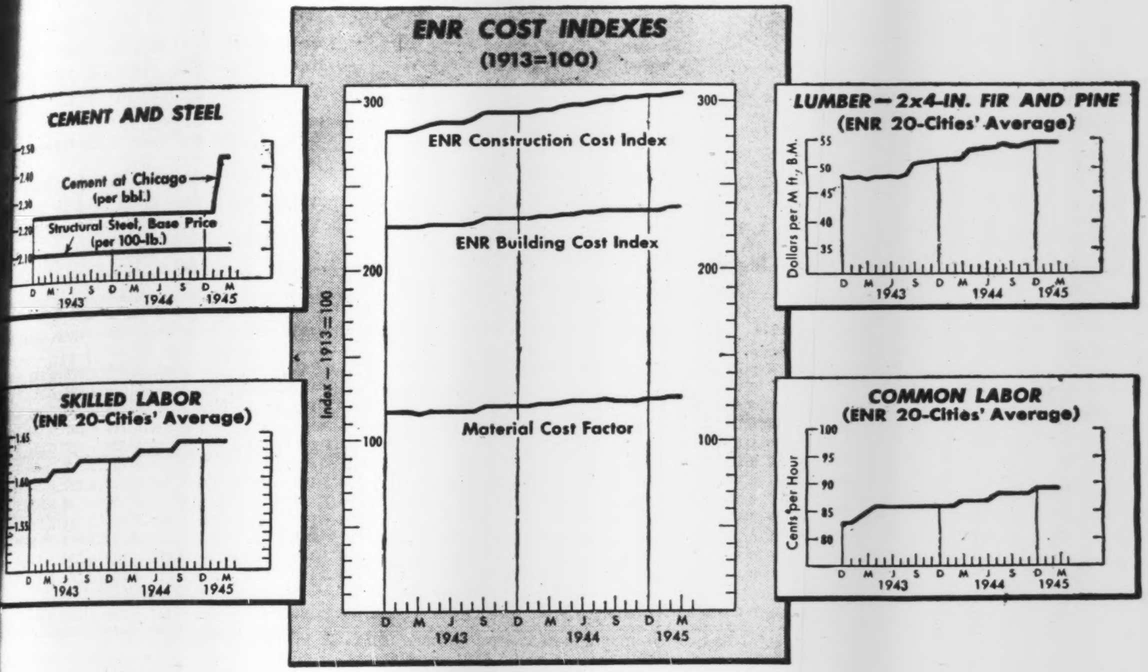
Supplies of most off-the-road ti are limited. Place tentative orders ear See the local B. F. Goodrich dealer f information, or write us direct. T *B. F. Goodrich Company, Akron, Ohi*

B. F. Goodric
Truck & Bus Tire

Introduction to

Construction Costs

1945 Edition



ɴSTRUCTION COSTS continued to rise dually in 1944 and at the year end d reached the new all-time high of 2.30, 2.6 percent above the January 44 value as measured by the *ENR* nstruction Cost Index. Labor rate erages and lumber prices, moving to w heights, continued as the cause.

The common construction labor ctor rose 2.4 percent during 1944, d skilled labor climbed 1.3 percent. mber prices increased 6.3 percent the twelve months, but both cement nd structural steel went through 944 without price changes.

The rise in construction labor costs, owever, was less than half as much the rise in manufacturing labor osts. Compared with the 2.4 per- nt for common and 1.3 percent for killed construction wage increases, ourly labor rate averages in 26 man- facturing industries (National In- ustrial Conference Board) rose 5.0 ercent over 1943 for skilled and emi-skilled labor and 4.0 percent for ommon manufacturing labor.

Factors other than material price uotations and labor rates continued o swell contractor's costs during the year. Acute material shortages due to military demands were still in evidence. Reworking of materials at hand, use of substitutes, and buying out of normal marketing areas in cases of local shortages, all continued to add to costs. The competition for labor between builders and war plants also remained an important cost factor. However, with the completion of the huge military construction program at home, the need for overtime labor on rush jobs has been drastically reduced, offsetting to some degree, the increases due to "invisible" cost factors.

In the opening months of 1945, the steady rise in costs has continued. The March *ENR* Construction Cost Index value, 304.50, was at a new high as a result of the increase in cement prices and approved labor rate increases.

Postwar construction costs are expected to start off at about current levels. The long-time economic trend toward less field fabrication and more off-site pre-fabrication in mills and factories will be affected by current proportionately higher factory labor rates. An analysis of the annual average construction labor rates since 1939 and those reported for 26 manufacturing industries, shows the skilled construction labor average 33 percent above manufacturing rates in 1944 compared with 78 percent in 1939, due to the fact that since 1939, skilled construction labor rates have climbed but 13 percent, while the manufacturing skilled average is up 53 percent. In common labor, the construction average for 1944 is 1.3 percent lower than that for manufacturing. In 1939 construction common labor was 15 percent higher than the manufacturing average. Thus, while construction common labor average wage has increased 29 percent, manufacturing common has climbed 50 percent. (See chart on outside cover).

In the return to a civilian economy, one of the first jobs of the industry will be to sharpen its pencils and attack the construction costs problem. It is reasonable to believe that labor rates will continue at current record heights. The only hope of reducing construction costs and prices is through better engineering and management.

ENR Construction Cost Index

THE ENGINEERING NEWS-RECORD Construction Cost Index has four components: (1) structural steel shapes, base price; (2) cement at Chicago; (3) lumber, which until 1935 was 12 x 12 long leaf yellow pine wholesale at New York, and since 1935 is 2 x 4 S4S pine and fir in carload lots, *ENR* 20-cities average; (4) common labor, *ENR* 20-cities average of wage rates in force.

The weighting for the original price series is given in the following computation for December, 1934:

Steel 25 cwt. x 1.80 = 45.00
Lumber 0.6 x 61.00 = 36.60
Cement 6 x 2.00 = 12.00
Labor 200 x .5413 = 108.26

Index 201.86

The weighting for the new lumber price series is 1.088, and the computation for January, 1945 index is:

Steel 25 cwt. x 2.0675 = 51.69
Lumber 1.088 x 54.38 = 59.17
Cement 6 x 2.24 = 13.44
Labor 200 x .891 = 178.20

Index 302.50

This Construction Cost Index
designed to predict changes in c
struction cost trends and to meas
the movement of construction co
in general. It is not intended to ap
to any specific class of constructi
or to a particular locality.

ENR Building Cost Index

In practice, the construction c
index has been used widely to app

Engineering News-Record BUILDING Cost Index—1913 = 100

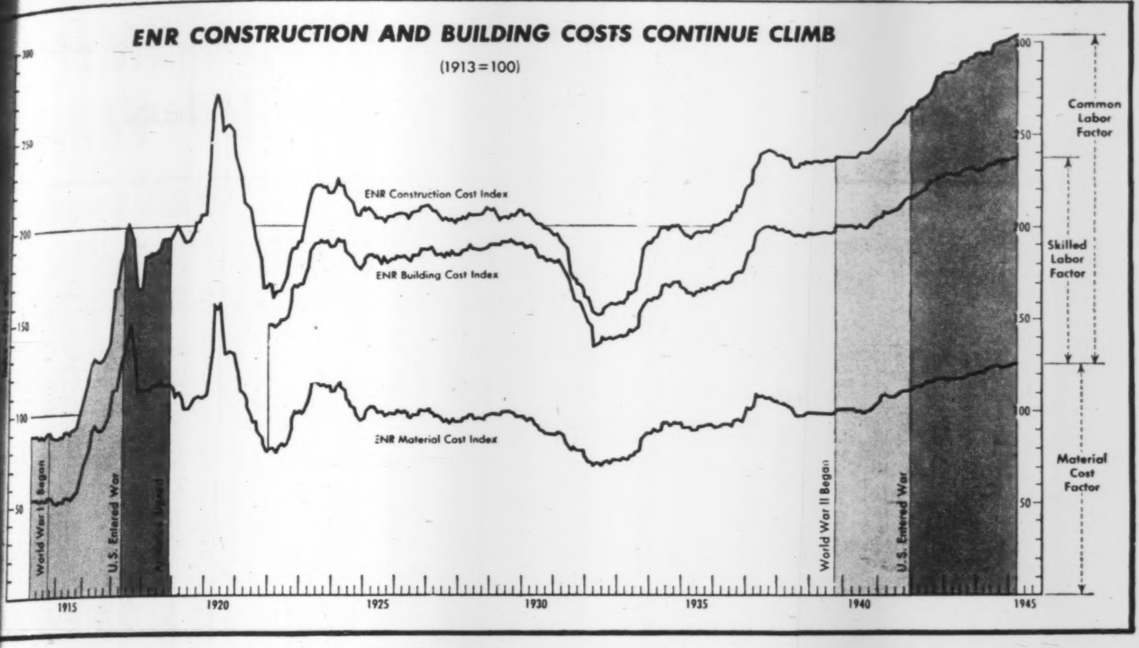
Yearly Av. 1910'-23			1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935†	1936†	1937†	1938†	1939†	1940†	1941†	1942†	1943†	1944†
1910..	96.4	J	189.3	182.7	184.3	187.8	185.9	190.0	190.3	180.7	150.6	140.8	160.2	166.5	168.3	185.5	198.6	196.2	201.5	207.9	217.1	226.9	231.6
1911..	94.1	F	191.7	184.5	183.7	189.2	187.2	190.0	188.5	182.0	147.2	141.7	161.3	165.8	168.4	186.6	199.0	196.2	201.5	208.4	218.4	226.9	232.0
1912..	91.4	M	194.1	184.5	184.3	187.3	187.2	190.0	189.2	180.2	145.9	140.8	161.7	164.1	169.7	187.7	199.3	196.5	201.5	207.9	218.9	226.7	232.3
1913..	100.0	A	191.8	184.7	184.1	186.0	188.8	190.0	188.8	177.6	135.7	141.5	163.2	164.4	170.0	195.0	198.2	196.5	201.4	208.6	219.6	227.5	234.5
1914..	91.9	M	192.5	182.8	183.6	185.4	190.1	191.3	187.9	174.6	136.4	143.9	168.2	163.3	170.3	197.2	197.9	196.6	201.2	209.2	220.1	227.6	234.8
1915..	95.3	J	187.7	183.0	181.8	185.8	187.6	192.0	185.4	172.5	137.6	143.2	168.2	164.9	170.2	199.2	198.2	196.4	201.7	209.4	221.2	227.7	235.3
1916..	130.9	J	184.5	180.2	184.3	183.9	187.6	192.0	183.3	170.5	139.5	144.3	169.2	165.3	170.9	199.8	194.4	196.8	201.7	210.2	223.5	227.9	235.6
1917..	166.8	A	183.3	183.0	185.1	186.5	187.6	192.8	183.7	163.1	139.4	145.9	168.4	166.2	173.9	200.7	194.5	196.5	201.7	212.5	225.4	228.5	236.1
1918..	159.1	S	181.4	180.5	185.1	184.6	187.6	191.6	182.4	159.5	139.6	154.5	170.1	166.1	174.3	200.6	194.8	196.6	203.1	214.6	225.5	231.2	236.0
1919..	158.8	O	178.4	181.8	188.0	186.6	187.6	190.3	181.8	159.5	140.0	157.1	170.2	167.3	175.3	201.0	195.5	198.5	204.0	215.9	225.9	231.3	236.0
1920..	207.2	N	176.5	182.4	188.0	185.0	188.0	190.3	181.8	158.3	139.5	159.0	170.2	167.3	175.5	200.3	195.6	201.2	206.2	216.5	226.6	231.4	236.1
1921..	166.1	D	178.4	183.1	188.0	185.1	190.0	190.3	181.8	155.0	140.0	160.7	170.2	167.2	179.3	200.5	196.1	201.2	208.2	216.4	226.6	231.5	236.5
1922..	154.9																						
1923..	186.0	Av.	185.8	182.7	185.0	186.1	188.0	190.9	185.4	169.4	140.9	147.8	166.7	165.8	172.2	196.2	196.8	197.4	202.8	211.5	222.4	228.8	234.7

Engineering News-Record CONSTRUCTION Cost Index—1913 = 100

Yearly Aver. 1903-'14			1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
		J	87.12	112.66	167.75	184.51	198.05	206.55	237.08	168.72	191.70	217.90	210.40	207.15	211.50	203.90	209.40	208.96	194.48
1903...	93.90	F	87.36	116.66	167.75	184.51	201.50	225.10	230.67	168.72	197.40	220.30	209.70	206.55	210.15	204.65	210.40	206.46	196.61
1904...	87.40	M	87.66	125.16	175.66	184.51	198.05	240.85	224.27	162.04	205.25	224.70	210.20	207.65	208.80	204.65	207.78	206.80	194.51
1905...	90.55	A	90.16	129.51	183.41	186.01	191.25	265.20	213.07	164.72	213.50	221.60	209.55	207.05	209.00	206.40	203.40	207.12	191.63
1906...	95.10	M	90.16	131.06	187.61	186.01	191.25	268.90	210.82	164.62	216.70	222.38	207.20	207.30	206.80	207.00	205.15	205.86	189.33
1907...	100.55	J	88.96	128.71	199.26	186.31	191.85	273.80	209.82	166.62	220.70	216.85	204.60	204.80	205.55	206.15	205.65	203.36	187.23
1908...	97.20	J	90.51	127.96	204.01	188.65	193.65	265.65	203.82	169.70	222.10	214.40	204.60	207.80	203.68	206.65	204.77	200.95	174.37
1909...	90.92	A	91.76	128.76	198.41	193.85	196.65	252.00	193.47	173.40	221.50	213.15	204.60	208.30	205.50	207.29	205.91	200.95	171.38
1910...	96.33	S	93.01	131.76	190.31	193.85	202.85	255.20	188.27	185.00	221.50	211.25	202.10	208.30	203.60	207.29	207.57	199.58	171.40
1911...	93.43	O	96.16	135.11	167.11	193.85	202.25	255.20	182.57	188.60	220.30	207.55	205.35	209.80	204.40	207.71	206.32	198.72	169.78
1912...	90.70	N	101.06	138.16	166.51	193.55	206.85	255.32	166.32	188.60	220.90	205.70	205.95	210.80	201.98	209.46	208.46	198.54	169.28
1913...	100.00	D	107.06	149.41	167.11	194.75	206.85	251.62	167.82	192.60	217.30	208.58	205.95	210.80	203.90	210.16	209.46	196.86	166.23
1914...	88.56																		
		Aver.	92.58	129.58	181.24	189.20	198.42	251.28	201.81	174.45	214.07	215.36	206.68	208.03	206.24	206.78	207.02	202.85	181.35

Engineering News-Record CONSTRUCTION Cost Index—1926 = 100

Yearly Aver. 1903-'14			1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
1926 = 100		J	41.9	54.2	80.6	88.7	95.2	99.3	110.0	81.1	92.2	104.7	101.1	99.6	101.7	98.0	100.6	100.4	93.5	78.1
		F	42.0	56.1	80.6	88.7	96.9	108.2	110.9	81.1	94.9	105.9	100.8	99.3	101.0	98.4	101.1	99.2	94.5	77.8
1903...	45	M	42.1	60.3	84.4	88.7	95.2	115.8	107.8	77.9	98.7	108.0	101.0	99.8	100.3	98.4	99.9	99.5	93.5	75.6
1904...	42	A	43.3	62.0	88.2	89.5	91.9	127.5	102.4	79.2	102.6	106.5	100.7	99.5	100.4	99.2	97.8	99.6	92.1	73.6
1905...	43.5	M	43.3	63.0	90.2	89.5	91.9	129.3	101.3	79.1	104.2	106.9	99.6	99.7	99.4	99.6	98.6	99.0	91.0	73.4
1906...	46	J	42.7	61.9	95.8	89.5	92.2	131.6	100.9	80.1	106.1	104.3	98.4	98.5	98.8	99.1	98.9	97.8	90.0	73.2
1907...	51	J	43.5	61.5	98.1	90.7	93.1	127.6	98.0	81.6	106.8	103.1	98.4	99.9	97.9	99.3	98.4	96.6	83.8	73.7
1908...	47	A	44.1	62.0	95.4	93.2	94.5	121.1	93.0	83.4	106.5	102.4	98.4	100.1	98.8	99.6	99.0	96.6	82.4	73.4
1909...	44	S	45.1	63.3	91.5	93.2	97.5	122.7	90.5	88.9	106.5	101.5	97.1	100.1	97.9	99.6	99.8	95.9	82.4	73.9
1910...	46	O	46.2	64.8	80.3	93.2	97.2	122.7	87.8	90.7	105.9	99.8	98.7	100.9	98.3	99.8	99.2	95.5	81.6	76.5
1911...	45	N	48.4	66.4	80.0	93.0	99.4	122.7	80.0	90.7	106.2	98.9	99.0	101.3	97.1	100.7	100.2	95.4	81.4	76.0
1912...	43.5	D	51.4	71.8	80.3	93.6	99.4	121.0	80.6	92.6	104.5	100.2	99.0	101.3	98.0	101.0	100.7	94.6	79.9	76.2
1913...	48																			
1914...	42.5	Aver.	44.5	62.2	87.1	90.9	95.3	120.8	97.0	83.8	102.9	103.5	99.4	100.0	99.1	99.4	99.5	97.5	87.1	75.4


ENR CONSTRUCTION AND BUILDING COSTS CONTINUE CLIMB

(1913=100)

building costs, and when common d skilled labor rates move in simi- trends it is a satisfactory measure relative building cost movement. However, following the low wage rates of 1932, common labor climbed much faster than skilled and reached new all-time highs by July, 1937.

† Based on 2 x 4 S4S fir and pine *ENR* 20-cities' average lumber component instead of x 12 yellow pine wholesale in New York used prior to 1935. For explanation see page 5 of June 30, 1938 *ENR*.

CONSTRUCTION Cost Index—1913 = 100

33	1934	1935†	1936†	1937†	1938†	1939†	1940†	1941†	1942†	1943†	1944†	1945†
8.44	191.26	198.22	201.23	221.20	239.62	234.72	238.34	249.69	267.63	283.45	294.57	302.50
9.30	194.06	195.07	201.33	222.05	238.99	234.31	238.32	250.50	269.41	283.48	295.05	303.70
8.44	194.06	194.41	201.68	224.75	238.79	234.43	238.29	250.71	269.71	285.24	295.34	304.50
0.16	195.86	194.65	202.80	231.35	237.95	234.86	238.26	252.40	271.78	288.80	297.70	306.43
4.39	199.61	193.96	204.05	233.45	236.80	234.69	238.86	255.55	272.30	289.87	298.00	....
3.41	199.61	196.73	205.08	237.25	236.86	235.02	241.59	256.79	274.19	289.94	298.72	....
5.50	199.65	197.43	204.80	239.90	232.29	234.94	242.15	258.18	277.65	289.92	299.94	....
7.00	198.40	197.45	208.48	240.65	232.39	234.90	242.18	260.41	281.61	291.38	300.42	....
5.48	200.58	197.30	208.88	241.62	232.70	234.97	244.13	263.12	281.61	294.09	300.46	....
7.74	200.86	197.50	211.53	241.90	234.30	236.86	245.02	264.46	282.44	294.31	301.06	....
0.14	201.36	197.35	211.50	241.40	234.40	238.20	247.24	266.13	283.64	294.41	301.09	....
2.41	201.86	197.20	215.70	241.05	234.89	238.17	249.12	266.16	283.69	294.51	302.30	....
70.18	198.10	196.44	206.42	234.71	235.86	235.51	241.96	257.84	276.31	289.95	298.64	....

CONSTRUCTION Cost Index—1926 = 100

1933	1934	1935†	1936†	1937†	1938†	1939†	1940†	1941†	1942†	1943†	1944†	1945†
76.2	91.9	95.3	96.7	106.2	114.9	112.9	114.6	120.0	128.7	136.3	141.6	145.4
76.6	93.3	93.8	96.8	106.7	114.9	112.7	114.6	120.4	129.5	136.3	141.8	146.0
76.2	93.3	93.5	96.9	108.0	114.8	112.7	114.6	120.5	129.7	137.1	142.0	146.4
77.0	94.1	93.5	97.5	111.2	114.4	112.9	114.5	121.3	130.6	138.8	143.1	147.3
79.0	95.9	93.2	98.2	112.0	113.8	112.8	114.8	122.8	130.9	139.3	143.3	....
78.5	95.9	94.6	98.5	113.8	113.9	113.0	116.1	123.4	131.8	139.4	143.6	....
79.6	96.0	94.9	98.4	115.1	111.7	112.9	116.4	124.1	133.5	139.4	144.2	....
80.3	95.4	94.9	100.2	115.7	111.7	112.9	116.4	125.2	135.4	140.1	144.4	....
84.4	96.4	94.9	100.4	115.9	111.9	113.0	117.4	126.5	135.4	141.4	144.4	....
90.2	96.6	95.0	101.5	116.1	112.7	113.9	117.8	127.1	135.8	141.5	144.7	....
91.4	96.8	94.9	101.5	115.8	112.7	114.5	118.9	127.9	136.4	141.5	144.7	....
92.4	97.0	94.8	103.4	115.7	112.9	114.5	119.8	127.9	136.4	141.6	145.3	....
81.8	95.2	94.4	99.2	112.7	113.3	113.2	116.3	124.0	132.8	139.4	143.6	....

The increase was in the lower ranges between union and non-union. When "prevailing" wages became synonymous with union wages the gap closed up, hence the *ENR* 20-cities wage average increased more rapidly than the union rates.

To provide a more representative measure of building cost movement, the skilled labor trend has been substituted for the common labor trend in the *ENR* Construction Cost index, and the *ENR* Building Cost index computed. The labor weighting applied to the *ENR* skilled labor average for 20-cities thus becomes 68.38 hr., and the computation for the Jan. 1945 Building Cost Index is:

Steel	25 cwt. x	2.0675 =	51.69
Lumber	1.088 x	54.38 =	59.17
Cement	6 x	2.24 =	13.44
Labor	68.38 x	1.641 =	112.21
Index			**236.51**

Base Conversion Table

To convert *ENR* Construction and Building Cost Indexes

From
1913 = 100 Base
To Divide 1913 = 100 Values By

	Const. Cost	Bldg. Index
1926 = 100	2.0803	1.8499
1929 = 100	2.0702	1.9086
1910–14 = 100	.9380	.9477
1924 = 100	2.1536	1.8578
1923–25 = 100	2.1204	1.8481
1914 = 100	.8856	.9191
1911 = 100	.9343	.9414

Special Building Cost and Volume Indexes

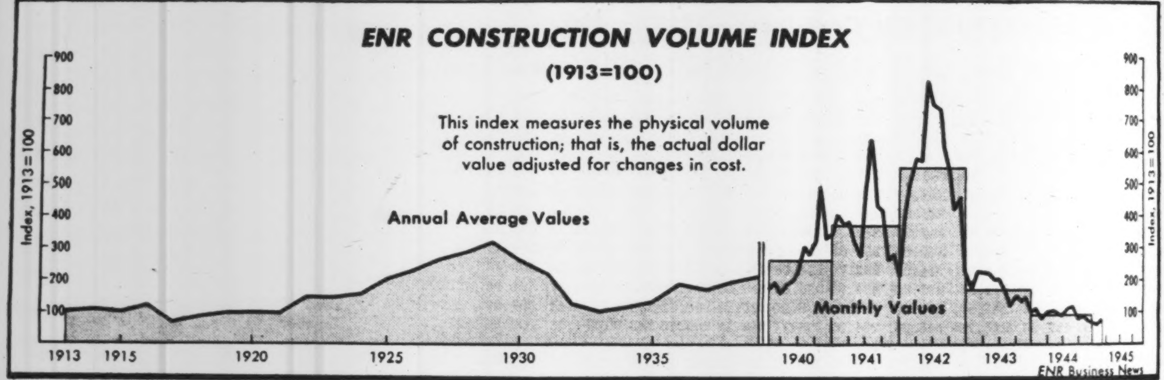
The American Appraisal Company Construction Cost Trend Index — 1913 = 100

For average of four types of buildings: All Frame, Brick-Wood Frame, Brick-Steel Frame and Reinforced Concrete.

These indices cover structural items only, and do not include factors for Plumbing, Heating, Lighting, Elevators, etc.

	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39	'40	'41	'42	'43
U. S. AVER.	**98**	**101**	**116**	**143**	**177**	**229**	**283**	**216**	**200**	**224**	**222**	**217**	**217**	**217**	**217**	**217**	**200**	**178**	**155**	**150**	**161**	**162**	**170**	**198**	**199**	**200**	204	218	241	252
						24 Cities																30 Cities								
Boston	100	103	118	149	183	234	288	220	209	232	229	224	224	222	222	224	212	195	169	163	170	169	178	212	209	210	214	225	248	254
New York	99	100	115	142	175	227	299	245	219	245	241	230	234	234	235	237	219	201	170	167	176	174	182	213	216	219	223	233	248	254
Buffalo	98	99	115	144	180	232	278	214	197	228	225	218	219	217	213	212	195	178	157	150	160	158	165	202	206	205	207	221	247	256
Baltimore	97	99	116	150	193	239	289	215	206	233	229	226	224	226	227	228	211	186	166	158	167	173	180	200	200	198	209	220	248	256
Philadelphia	98	102	115	145	181	236	300	220	201	232	230	224	225	228	227	227	209	190	161	156	166	166	171	193	194	196	207	225	247	254
Pittsburgh	97	99	115	142	179	231	290	221	201	228	238	233	236	237	236	236	217	198	172	161	170	168	177	211	219	219	219	225	249	259
Cincinnati	99	100	115	143	173	217	276	211	194	221	221	219	217	219	219	220	202	176	157	151	161	162	174	206	209	209	213	223	242	250
Cleveland	97	99	120	149	179	233	303	227	210	241	243	236	233	231	232	232	213	188	160	151	164	168	175	208	207	206	209	224	245	249
Chicago	97	100	116	141	170	224	294	226	202	228	225	224	219	222	222	222	205	185	162	156	166	169	179	204	205	205	207	216	235	244
Indianapolis	102	104	119	146	175	221	279	221	202	225	227	222	219	222	224	224	206	182	157	150	161	161	169	199	204	205	209	233	247	257
Detroit	99	102	122	150	187	244	304	220	200	229	227	226	224	222	221	220	202	174	148	146	157	160	168	203	205	207	212	226	252	259
Milwaukee	100	103	120	150	178	237	290	212	195	224	224	217	218	219	220	218	197	163	144	141	156	163	178	208	208	209	213	225	254	264
Minneapolis	98	100	114	142	171	218	277	210	193	214	208	201	197	197	197	198	182	165	148	146	154	154	162	199	201	202	203	214	235	241
Kansas City	98	102	120	150	184	239	280	220	211	231	228	220	220	215	213	213	193	178	156	149	160	162	169	202	209	209	211	221	239	249
St. Louis	97	100	114	141	175	228	284	225	204	228	238	233	230	226	225	224	205	188	163	156	166	164	171	207	207	207	211	220	238	245
Atlanta	97	98	111	140	186	250	304	218	202	226	217	209	211	214	215	215	195	173	147	142	162	163	170	192	185	187	193	215	240	257
Dallas	100	105	121	145	176	227	274	209	191	209	206	198	204	204	202	202	187	168	146	139	149	148	154	170	168	171	173	187	209	224
New Orleans	97	96	113	136	174	239	282	217	201	225	227	216	217	218	215	215	198	170	145	141	159	159	166	186	187	194	202	214	234	244
Denver	100	102	118	145	171	216	262	206	191	202	206	204	204	202	205	207	189	168	149	141	150	151	157	190	193	195	199	209	226	233
Seattle	96	101	115	141	176	224	268	197	186	207	206	201	199	195	194	198	184	159	141	136	150	154	161	194	193	195	200	219	244	255
San Francisco	97	104	118	139	169	214	258	204	189	208	199	194	188	188	188	190	177	158	144	138	145	144	155	178	176	180	181	201	225	232
Los Angeles	97	102	112	133	162	213	251	208	199	213	204	197	195	193	193	196	178	157	141	134	142	140	143	165	166	167	166	183	213	236

NOTE — These construction cost index figures are based on 1913 as 100% for each individual location, thus indicating the trend in each city and not the trend between the various locations. The index figures are calculated on the basis of normal average material prices, average labor wages, and the market conditions in the individual cities and do not reflect extremes such as premium prices and overtime wages for rush work during boom periods or the "extreme low" of cut-throat practices during the "depression periods."



Engineering News-Record Construction Volume Index — 1913 = 100

	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39	'40	'41	'42	'43	'44	'45
Jan.	71	48	96	69	57	38	138	52	100	151	125	141	198	187	208	325	199	208	121	129	149	131	248	168	172	287	173	402	402	172	114	63
Feb.	83	76	95	47	151	91	130	55	68	129	144	145	187	182	225	378	204	198	105	82	156	75	177	181	189	187	196	374	507	231	86	78
Mar.	142	75	90	55	90	52	113	90	186	162	161	161	240	226	318	382	408	278	97	62	130	101	157	146	188	210	162	386	578	228	103	103
Apr.	113	82	137	65	58	78	134	109	161	186	159	211	233	257	316	332	320	289	135	65	109	130	165	160	176	221	191	322	569	225	106	....
May	155	96	129	50	67	80	126	108	221	149	191	209	254	290	299	395	354	251	149	103	101	107	148	214	167	232	201	275	821	203	100	....
June	128	105	129	57	106	129	92	119	178	173	149	214	246	207	308	347	324	243	131	109	119	120	193	246	166	193	225	492	752	204	91	....
July	139	129	136	87	107	122	83	115	146	151	161	178	248	252	266	320	226	248	166	65	128	95	187	187	207	166	308	635	736	175	114	....
Aug.	118	126	130	63	111	135	86	116	137	100	162	266	252	306	306	290	259	187	111	73	94	138	197	152	215	228	281	434	622	119	121	....
Sept.	95	116	145	166	145	113	80	109	149	166	159	262	227	273	296	340	232	225	124	122	101	125	201	150	213	190	324	419	544	155	85	....
Oct.	108	101	97	87	67	207	79	130	154	154	164	233	244	269	363	273	211	229	137	162	98	159	180	167	217	222	490	263	421	142	91	....
Nov.	84	150	105	76	66	71	57	106	114	121	128	194	211	272	251	245	207	180	137	133	115	169	163	148	199	219	331	282	462	149	74	....
Dec.	62	89	106	49	27	41	63	117	134	123	145	206	188	319	244	166	192	133	113	116	105	252	208	143	249	172	344	217	227	103	66	....
Aver.	107	100	119	67	86	98	99	96	147	146	154	201	228	263	287	317	260	220	127	102	114	134	185	172	197	211	269	375	553	176	96	....
1926 = 100	47	44	52	39	38	43	43	42	64	64	68	88	100	115	126	139	114	96	56	45	50	59	81	75	86	92	118	164	243	77	42	

New value reported in *Engineering News-Record* each month.

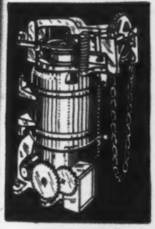
"TIME-PROVEN" KINNEAR DOORS ARE FIRST CHOICE with POST-WAR PLANNERS

Many have been in continuous service for over 40 years

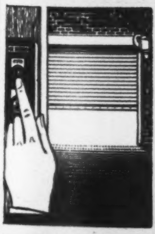
KINNEAR RoL-TOP DOORS

KING
KINNEAR BI-FOLD DOORS

Designed for use wherever sturdy dependability and quick, easy operation are desired, Kinnear Steel Rolling Doors feature an all-metal curtain of rugged, flexible, interlocking steel slats. Coiling upward into a small enclosed roll, the curtain clears the opening completely, saving floor and wall space and remaining out of reach of damage when open.



THE KINNEAR MOTOR OPERATOR, with its specially designed bronze bearings, machine cut gears and high torque output motor, is built into an integral unit of exceptionally long life. Just a touch on the control button and the motor operator goes instantly into action, opening or closing the Kinnear Door. This easy, convenient door control assures additional savings.



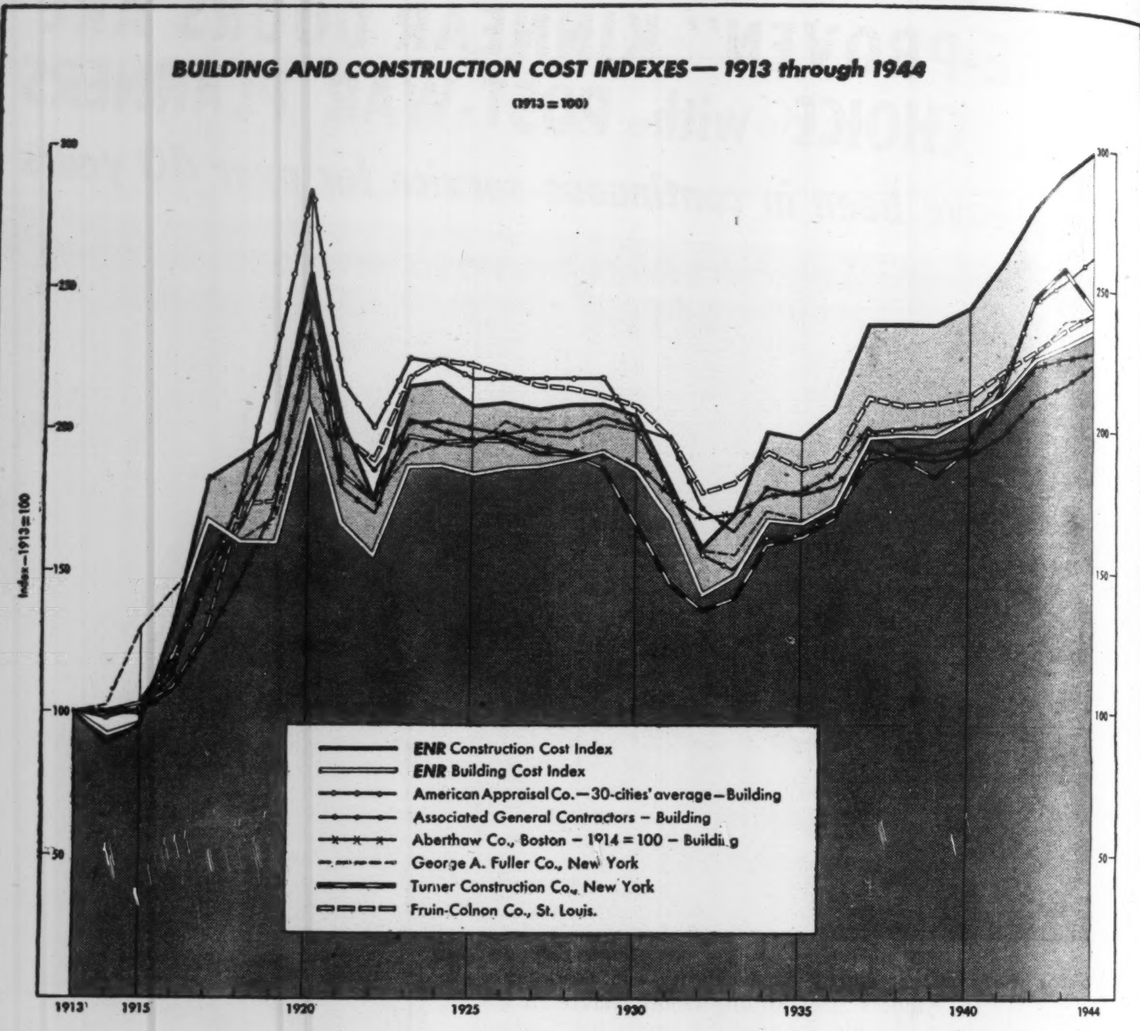
KINNEAR REMOTE CONTROL SWITCHES, permitting doors to be operated from any number of strategic points, are easily installed. Additional savings in steps and time are realized, as any number of doors can be operated from any one point. Write for complete details!

The KINNEAR Mfg. Co. Factories: 1820-40 Fields Ave., Columbus 16, Ohio and 1742 Yosemite Ave., San Francisco 24, Calif. Offices and agents in principal cities.

SAVING WAYS IN DOORWAYS
KINNEAR
ROLLING DOORS

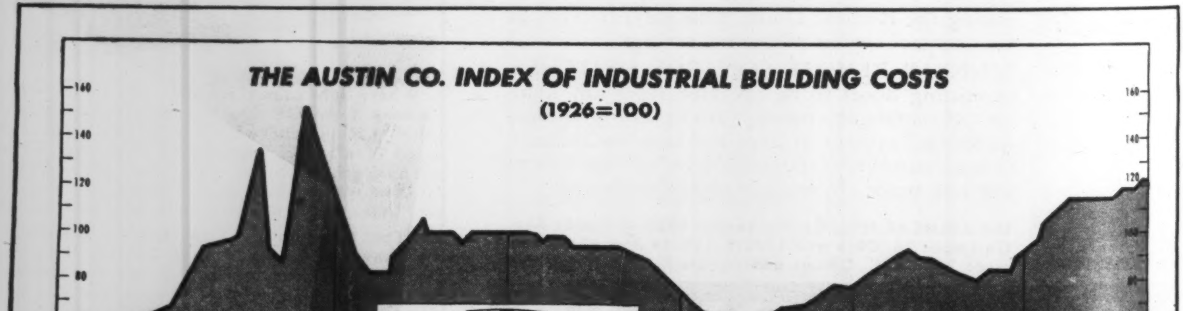
1. Where light admittance and visibility are desired, Kinnear RoL-TOP Doors combine any window-panel arrangement with upward action, in either wood or all steel construction. The door sections are hinged horizontally, slide in steel tracks mounted on door jamb and extending horizontally back from the lintel, and are accurately counterbalanced.

2. The Kinnear BIFOLD Door is composed of two leaves or sections, hinged together horizontally and pivoting from brackets at the top corners of the opening. It combines the qualities of a heavy-duty, quick-acting door with minimum space requirements, and permits large sash areas. Available in either wood or all steel, with torsion-spring counterbalance.



BUILDING AND CONSTRUCTION COST INDEXES—1913 through 1944

(1913 = 100)



THE AUSTIN CO. INDEX OF INDUSTRIAL BUILDING COSTS

(1926=100)

Construction and Building Cost Indexes—1913 through 1944

AAC (Old) 1913	AAC (New) 1913	AGC 1913	ENR Bldg. 1913	ENR Const. 1913	Boeckh New York 1913	Handy R. C. Atl. Seab'd. 1911-'14	ICC-RR Sta. & Off. Bldg. 1910-'14	Aber-thaw 1914	Austin Co. 1913	Fruin-Colnon 1913	Fuller 1913	Tilgh-man Moyer 1913	Turner 1913
100	100	100	100	100	100	...	...	...	100	100	100	100	100
98	98	99	92	89	102	...	...	100	105	100	102	92	100
101	101	100	95	93	99	...	101	100	115	102	130	96	103
116	116	114	131	130	116	153	115	107	141	108	143	115	120
144	143	152	167	181	135	233	135	126	172	128	156	142	147
172	177	175	159	189	155	242	154	147	206	173	160	148	166
213	229	198	159	198	171	237	185	172	198	174	168	190	196
270	283	247	207	251	230	260	215	234	241	227	209	258	252
205	216	200	166	202	193	207	192	179	180	197	188	210	183
189	200	184	155	174	187	165	180	170	157	188	175	177	175
212	224	201	186	214	215	199	194	202	181	217	190	214	196
210	222	202	186	215	215	226	193	198	181	223	194	212	194
203	217	199	183	207	211	219	188	195	185	222	193	209	195
206	217	197	185	208	230	213	184	197	185	218	202	207	195
206	217	200	186	206	223	208	189	193	178	214	197	202	190
205	217	199	188	207	238	205	188	191	172	213	196	204	190
206	217	203	191	207	242	211	187	190	170	211	201	208	185
199	200	200	185	203	238	200	182	186	155	207	199	196	165
171	178	196	169	181	230	184	165	176	131	196	180	170	145
152	155	171	141	157	208	165	141	168	117	178	157	150	136
146	150	163	148	170	197	159	145	170	117	181	155	152	140
157	161	178	167	198	209	186	151	176	128	191	171	163	160
157	162	176	166	196	200	190	151	177	139	185	167	178	162
163	170	179	172	206	205	192	157	184	150	188	168	188	169
181	198	188	196	235	226	208	166	199	165	210	187	214	192
182	199	189	197	236	243	210	166	191	161	207	192	221	188
183	200	188	197	236	248	206	166	190	152	208	195	229	182
...	204	189	203	242	251	210	177	193	163	211	196	231½	193
...	217	198	211	258	255	228	188	207½	198	220	206	...	215
...	241	209	222	276	260	252	208	223	213	227	229	...	245
...	252	216	229	290	264	254	219	225	215	235	238	...	257
...	261	223	235	299	284	257	...	227	223	241	240	...	244

Descriptions of Leading Building and Construction Cost Indexes

RICAN APPRAISAL COMPANY C)—Average for 30 cities of four types buildings: wood frame, brick-wood e, brick-steel frame, reinforced con- Mechanicals not included. Based on l appraisal costs. Available for in- ual cities (see page 110). Recently ed to include adjustments for social rity taxes, unemployment insurance corresponding "overhead". Base: 1913 0.

OCIATED GENERAL CONTRACT- OF AMERICA (AGC)—Wages and rials for 12 cities combined in 40-60 . Wages, prevailing rates for hod car- and common labor. Materials, hted: sand, gravel and crushed stone, cement, 1; lumber, 1; hollow tile, ½; ctural and reinforcing steel, ½. Base: =100.

GINEERING NEWS-RECORD BUILD- COST (ENR Bldg.)—For complete ription see pages 108 and 109.

GINEERING NEWS-RECORD CON- RUCTION COST (ENR Const.)—For plete description see pages 108 and 109.

H. BOECKH & ASSOC., INC.—Indi- al series for ten types of buildings for een areas. Weights based on studies of al building costs—vary with different of structures. Material prices are those by contractors to material dealers. vailing skilled and common wage rates contractors. Base: United States aver- , 1926-29=100. Series given here is k and concrete, New York, converted to 1913=100 base. For further definition see page 120.

HANDY PUBLIC UTILITY CONSTRUCTION COST—Compiled and published Jan. 1 and July 1 of each year by Whitman, Requardt and Associates and Benjamin L. Smith & Associates. (See page 116.) Individual series for 81 cost elements in three classes of utility construction, for five geographic divisions of United States.

Weighting based on wide experience in cost analysis of plant and construction. Material prices from Engineering News-Record, Iron Age and various manufacturers. Labor rates from Utilities, Unions and Builders Associations. Base: 1911-'14 =100. The reinforced concrete building construction series is tabulated in this table.

RAILROAD CONSTRUCTION INDEX (ICC-RR)—Compiled by Engineering Section, Bureau of Valuation, Interstate Commerce Commission. (See page 114). Indexes for road (47 subseries), equipment (8 subseries), and general expenditures (7 subseries), for national average and 8 regional areas. Series quoted here is road, subseries 16, station and office buildings, national average. Computed from analysis of contracts covering major construction projects over 30-year period, and other information furnished by carriers. Base: 1910-14=100.

ABERTHAW—New England, seven-story and basement (62'4"x202'4"), reinforced concrete building built in 1914, repriced quarterly as a construction bid to duplicate original building. Labor costs based on current experience with similar construction. Base: 1914=100.

AUSTIN INDUSTRIAL BUILDING COST—Repricing typical one-story, steel frame, monitor type industrial building at regular intervals. Structure has concrete foundations, curtain walls of brick and large areas of steel sash and glass; concrete floor laid on ground; 2-in. lumber roof deck on heavy timber covered with 4-ply waterproofing. Monitor sash equipped with mechanical operators. Pricing at representative points in central and eastern states. Base: 1926=100. (See page 112.) Table series converted to 1913=100.

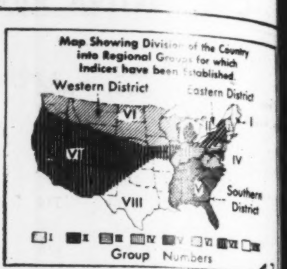
FRUIN-COLNON—Industrial plant of five buildings in St. Louis repriced on basis of contractor's actual and estimated material and labor costs. Base: 1913=100.

GEORGE A. FULLER COMPANY—Composite of 36 major cost elements, in three commercial type buildings, including mechanicals, elevators, wiring, heating and ventilating, repriced. Base 1913=100.

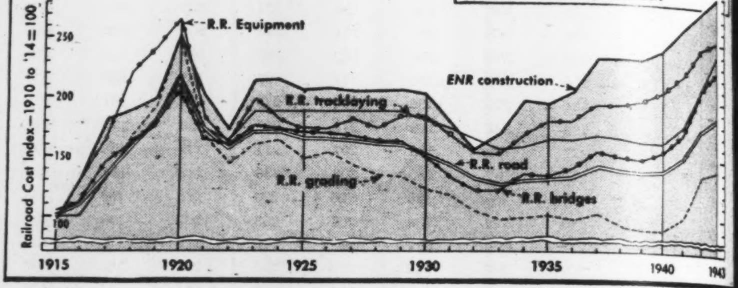
TILGHMAN MOYER COMPANY—Compiled monthly from actual cost records in construction of bank buildings in eastern United States. Includes all typical building items, and, in addition, all fixtures which are special in bank work, which in many cases exceed structural costs. Index reflects saving occasioned by use of reconditioned equipment from closed banks. Base: 1913=100. Not computed since 1940.

TURNER CONSTRUCTION COMPANY—Eastern cities. Own building cost experience applied to these factors: labor rates, material prices, productivity of labor, efficiency of plant and management, competitive conditions. Base: 1913=100.

Railroad Construction Cost Indexes


Map Showing Division of the Country into Regional Groups for which Indices have been Established
Western District
Eastern District
Southern District
I
II
III
IV
V
VI
VII
VIII
Group Numbers

THESE INDEXES by Engineering Section, Bureau of Valuation, Interstate Commerce Commission, include items developed from analysis of major construction contracts over a period of 30 years. Indexes for material accounts are based on studies of carriers' returns to Valuation Order 14, joint studies made with various sub-committees of Presidents' Conference Committee, well-known engineering and trade publications, contracts covering major construction projects over a period of 30 years, and other information furnished by individual carriers.



Railroad Cost Indexes for Regions by Years for "Road" Construction — 1910-14 = 100

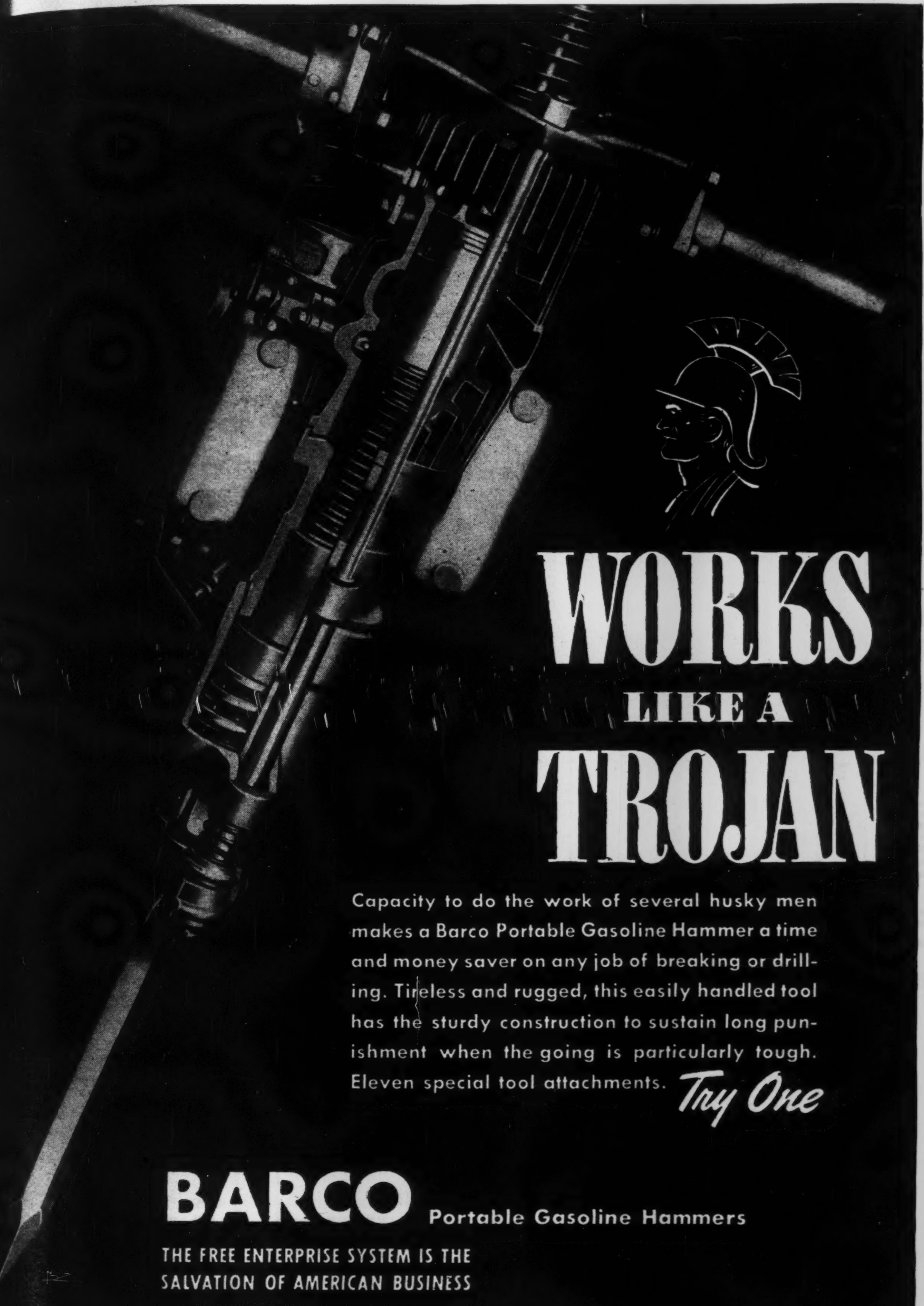
Total of Accounts 1-46, ROAD, Engineering Section, Bureau of Valuation, Interstate Commerce Commission, August 1, 1944

United States	Per Cent	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Reg. I to VIII....	**73.09**	**214**	**175**	**157**	**171**	**171**	**166**	**166**	**164**	**161**	**160**	**152**	**143**	**131**	**127**	**131**	**131**	**133**	**142**	**138**	**137**	**140**	**151**	**175**
Reg. I..........	75.36	220	178	163	177	178	172	173	171	167	166	158	148	134	131	133	134	136	146	141	140	144	156	180
Reg. II..........	68.15	214	176	160	174	174	168	168	167	165	164	157	145	133	130	134	134	136	146	142	141	145	156	178
Reg. III..........	67.99	214	176	160	173	173	169	168	167	164	163	155	143	132	129	133	133	136	146	142	144	146	157	179
Reg. IV..........	70.49	214	173	152	167	166	164	163	159	155	154	145	133	126	122	125	126	127	137	132	131	135	146	172
Reg. V..........	76.66	218	171	153	168	167	163	164	160	156	156	148	137	129	125	129	128	131	141	137	136	139	149	175
Reg. VI..........	77.41	215	175	155	169	170	163	164	162	158	158	150	138	129	125	128	128	129	139	134	132	135	145	171
Reg. VII..........	75.62	212	177	158	170	170	165	166	163	160	158	151	139	131	128	130	129	131	140	135	133	135	145	162
Reg. VIII..........	78.15	208	173	157	171	171	166	167	164	161	161	154	143	133	130	133	134	135	144	141	140	142	153	175

(Indexes represent territorial index factors and are not necessarily applicable for determining unit reproduction costs upon individual roads.)

Railroad Cost Index by Accounts Applicable to Entire U. S., Regions I to VIII, Inclusive

"Road" Construction	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Engineering..................	214	175	157	171	171	166	166	164	161	160	152	143	131	127	131	131	133	142	138	137	140	151	175
Grading..................	250	170	143	160	164	149	153	143	135	133	123	118	106	98	100	101	99	103	93	90	90	99	135
Underground Power Tubes.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tunnels and Subways..........	208	179	165	179	179	179	178	169	155	155	143	130	119	111	122	120	130	139	141	140	149	160	192
Bridges, Culverts. etc..........	206	165	160	176	173	171	170	168	164	163	150	134	122	122	136	135	141	155	150	149	156	174	210
Elevated Structures..........	210	150	153	173	171	168	165	163	163	162	154	144	129	122	136	136	137	158	150	149	159	175	209
Ties..................	201	189	157	177	175	172	173	175	176	175	170	155	144	139	149	147	150	159	154	158	164	181	199
Rails..................	168	158	144	145	145	144	144	144	144	144	144	144	140	134	123	123	124	143	139	136	138	139	144
Other Track Material..........	209	192	161	182	179	177	177	177	177	170	169	165	163	158	150	147	150	169	169	167	167	170	175
Ballast..................	207	191	176	175	175	174	175	176	176	176	168	159	146	146	141	139	140	143	143	143	143	153	170
Track Laying and Surfacing....	218	174	165	188	188	188	188	188	188	188	182	175	164	157	159	165	165	169	167	165	165	178	209
Right-of-way Fences..........	204	189	177	179	179	176	175	175	175	173	171	164	147	135	140	140	138	143	144	139	139	147	165
Snow, Sand Fences, Sheds......	280	197	194	212	200	201	201	204	204	204	198	188	125	126	140	140	140	155	155	155	155	164	174
Crossings and Signs..........	208	171	164	178	175	171	169	166	165	165	161	153	131	127	139	137	139	152	145	142	146	163	198
Station and Office Bldgs.......	215	192	180	194	193	188	184	189	188	187	182	165	141	145	151	151	157	166	166	166	177	188	208
Roadway Buildings..........	216	192	178	196	196	189	187	192	191	190	186	166	140	145	150	150	150	162	162	162	177	186	206
Water Stations..........	213	185	178	187	187	186	182	185	186	184	177	161	147	151	155	155	156	166	166	166	172	185	195
Fuel Stations..........	212	181	166	185	185	182	180	183	183	183	174	159	144	149	154	154	153	159	159	159	163	187	205
Shops and Engine Houses......	216	191	180	193	192	188	185	189	188	187	176	161	137	142	147	147	155	165	165	165	176	188	204
Grain Elevators..........	214	190	184	197	197	193	190	195	193	193	182	165	137	142	147	147	156	164	164	164	166	200	208
Storage Warehouses..........	210	193	178	198	198	193	189	193	191	191	184	165	137	142	147	147	154	166	166	166	176	195	207
Wharves and Docks..........	204	167	158	175	175	174	177	178	178	178	172	158	136	141	146	146	149	153	153	153	161	167	212
Coal and Ore Wharves..........	204	170	159	176	176	174	174	176	176	176	172	157	136	142	147	147	151	153	153	153	160	185	190
Gas Producing Plants..........	213	194	176	188	189	186	185	188	189	189	178	163	145	148	176	176	178	178	177	179	188	198	200
Telegraph and Telephone Lines.	192	191	162	187	179	163	157	163	165	165	150	138	121	119	124	128	131	135	129	129	134	143	156
Signals and Interlockers........	175	163	158	165	164	162	169	158	155	154	147	138	130	130	133	136	138	143	143	143	146	156	195
Power Dams, Canals, Pipe Lines.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	151	149	149	149	150	181	185
Power Plant Buildings..........	218	197	184	196	196	191	186	191	191	189	177	162	138	143	148	148	152	167	167	167	176	194	204
Power Substation Buildings....	218	194	180	197	197	192	188	193	191	190	176	161	137	142	147	147	138	164	164	164	175	187	203
Power Transmission System....	176	145	132	142	136	140	141	137	142	150	136	116	98	98	103	105	108	123	110	110	114	119	121
Power Distribution System.....	205	172	163	178	172	175	176	175	178	181	173	148	144	144	148	151	152	155	149	149	155	163	165
Power Line Poles, Fixtures.....	230	208	179	209	203	185	183	198	199	209	200	172	147	147	150	153	148	157	152	152	152	173	[illegible]
Underground Conduits..........	250	228	214	220	215	220	216	219	219	217	215	175	175	175	180	184	185	185	185	185	185	190	209
Miscellaneous Structures.......	217	192	179	195	195	190	186	191	190	189	182	164	141	146	151	151	154	161	161	161	168	178	183
Paving..................	217	191	190	191	191	191	190	190	190	190	190	181	156	150	145	145	145	150	150	150	150	171	190
Roadway Machines..........	170	162	149	151	151	151	151	151	149	148	147	144	138	138	147	147	147	161	153	154	158	169	[illegible]
Roadway Small Tools..........	202	181	170	173	185	190	190	191	191	190	160	155	155	150	150	150	160	170	180	180	180	190	[illegible]
Shop Machinery..........	210	198	173	183	185	185	186	187	189	191	176	166	155	155	179	179	179	198	200	202	212	224	224
Power Plant Machinery........	210	198	173	183	185	185	186	187	189	191	176	166	155	155	168	166	171	180	177	180	189	194	194
Power Substation Apparatus....	210	198	173	183	185	185	186	187	189	191	176	166	155	155	155	150	145	149	151	150	158	160	[illegible]



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Public Utility Construction Cost Index

Compiled and published by Whitman, Requardt and Associates, and B. L. Smith & Associates, Baltimore, Md., for the Estate of William W. Handy

Table No. 1 Cost Trends of Building Construction, 1911 to 1914 = 100

(Complete Index reports 13 items entering into Building Construction Costs.) A relates to Reinforced Concrete Bldg.; B relates to Brick Bldg.

Cl. of Constr. Mat'l, and Labor	Jan. 1, 1921	Sept. 1, 1921	Feb. 1, 1922	Jan. 1, 1923	Jan. 1, 1924	July 1, 1924	Jan. 1, 1925	July 1, 1925	Jan. 1, 1926	July 1, 1926	Jan. 1, 1927	July 1, 1927	Jan. 1, 1928	July 1, 1928	Jan. 1, 1929	July 1, 1929	Jan. 1, 1930	July 1, 1930	Jan. 1, 1931	July 1, 1931	Jan. 1, 1932	July 1, 1932	Jan. 1, 1933	July 1, 1933	Jan. 1, 1934	July 1, 1934	Jan. 1, 1935	July 1, 1935	Jan. 1, 1936	July 1, 1936	Jan. 1, 1937	July 1, 1937	Jan. 1, 1938	July 1, 1938	Jan. 1, 1939	July 1, 1939	Jan. 1, 1940	July 1, 1940	Jan. 1, 1941	July 1, 1941	Jan. 1, 1942	July 1, 1942	Jan. 1, 1943	July 1, 1943	Jan. 1, 1944	July 1, 1944	Jan. 1, 1945
Atlantic Seaboard Division																																															
A	233	182	165	199	227	224	221	216	213	213	214	203	204	206	209	212	205	194	189	179	171	159	153	165	178	194	191	189	191	192	199	216	214	205	205	207	210	209	220	235	250	253	254	254	256	258	259
B	245	207	188	215	237	232	230	229	228	229	230	223	224	217	219	220	212	207	203	194	180	173	166	175	189	200	195	194	197	197	203	218	217	211	211	214	217	216	224	235	246	250	251	252	254	255	262
North Central Division																																															
A	228	181	163	193	219	214	212	208	203	201	205	194	195	197	200	203	199	190	185	177	169	154	151	162	175	186	182	182	186	187	196	209	209	200	200	200	202	201	210	225	237	242	243	243	246	248	249
B	238	201	181	206	225	218	216	215	212	211	214	208	209	201	203	205	199	195	192	186	181	164	161	170	183	190	185	184	188	189	197	207	208	203	203	203	205	204	210	220	229	234	235	235	240	241	248
South Central Division																																															
A	229	181	160	191	213	206	203	196	192	191	194	186	186	188	191	193	187	179	176	159	149	144	140	148	160	173	179	173	175	177	187	200	198	188	188	187	189	190	199	216	232	236	237	235	237	241	242
B	240	224	181	206	221	211	208	205	203	204	205	201	202	195	197	198	190	185	183	168	160	154	151	157	171	179	182	175	178	180	186	198	197	191	191	191	193	194	200	212	223	227	230	229	230	234	235
Plateau Division																																															
A	221	181	164	192	215	208	208	201	198	197	199	188	189	191	194	196	190	180	177	166	153	149	146	156	168	178	174	172	176	180	188	206	203	194	194	194	197	196	205	218	230	235	235	233	237	237	238
B	232	203	185	207	223	214	214	211	211	210	211	205	205	199	200	201	193	187	184	175	167	163	160	168	182	187	182	181	182	185	191	206	204	199	199	200	201	201	206	214	221	227	229	227	229	230	231
Pacific Division																																															
A	226	187	165	191	212	205	203	196	191	190	196	185	185	188	191	194	188	178	175	165	157	148	145	153	166	177	174	173	175	178	186	200	199	192	192	192	194	192	201	217	238	241	243	242	243	245	248
B	234	207	185	204	217	206	205	201	198	197	203	197	197	190	192	194	186	180	177	169	164	156	154	156	170	177	172	173	176	179	185	198	197	193	193	193	195	194	199	210	226	231	234	234	236	237	241

Table No. 2 Cost Trends of Gas Plant Construction, 1911 = 100

(Complete Index reports 17 items entering into Gas Plant Construction Costs) A relates to Total Constr. & Equip.; B relates to Mech. Equip. Exclusive of Gas Holders

	July 1, 1920	Jan. 1, 1921	Sept. 1, 1921	Jan. 1, 1923	Jan. 1, 1924	July 1, 1924	Jan. 1, 1925	July 1, 1925	Jan. 1, 1926	July 1, 1926	Jan. 1, 1927	July 1, 1927	Jan. 1, 1928	July 1, 1928	Jan. 1, 1929	July 1, 1929	Jan. 1, 1930	July 1, 1930	Jan. 1, 1931	July 1, 1931	Jan. 1, 1932	July 1, 1932	Jan. 1, 1933	July 1, 1933	Jan. 1, 1934	July 1, 1934	Jan. 1, 1935	July 1, 1935	Jan. 1, 1936	July 1, 1936	Jan. 1, 1937	July 1, 1937	Jan. 1, 1938	July 1, 1938	Jan. 1, 1939	July 1, 1939	Jan. 1, 1940	July 1, 1940	Jan. 1, 1941	July 1, 1941	Jan. 1, 1942	July 1, 1942	Jan. 1, 1943	July 1, 1943	Jan. 1, 1944	July 1, 1944	Jan. 1, 1945
Atlantic Seaboard Division																																															
A	279	265	205	224	241	238	234	229	230	230	226	223	215	216	216	219	218	216	214	208	202	188	176	178	189	216	216	217	218	218	225	246	246	244	241	249	253	253	257	264	272	275	276	279	279	279	283
B	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277	274	274	278	282	282	282	295	297	299	299	298	298	296	296
North Central Division																																															
A	257	248	201	206	226	224	220	217	217	218	214	211	204	205	204	206	207	208	207	203	198	178	182	185	196	203	202	203	208	208	219	235	237	235	232	232	236	236	238	245	249	254	258	261	262	261	264
B	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277	274	274	278	282	282	282	295	297	299	299	298	298	296	296
South Central Division																																															
A	251	246	203	196	214	210	205	199	199	200	198	195	187	187	187	190	188	187	185	177	171	160	158	167	177	184	195	196	202	202	208	223	222	219	216	217	220	220	223	236	244	249	254	255	255	256	258
B	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277	274	274	278	282	282	282	295	297	299	299	298	298	296	296
Plateau Division																																															
A	234	231	194	193	210	206	206	201	202	202	198	195	187	189	189	191	189	188	186	181	176	166	170	173	184	191	190	190	195	195	202	221	221	220	216	217	220	220	223	228	232	237	238	238	239	239	240
B	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277	274	274	278	282	282	282	295	297	299	299	298	298	296	296
Pacific Division																																															
A	255	248	212	203	219	215	211	206	205	206	206	203	196	197	197	201	200	198	197	191	187	177	180	178	189	196	195	197	198	203	210	228	228	230	227	228	232	231	235	244	253	257	258	261	262	263	264
B	241	248	201	194	220	218	217	213	212	212	216	211	208	209	213	221	224	222	219	217	209	195	192	199	216	230	232	234	240	240	252	277	277	274	274	278	282	282	282	295	297	299	299	298	298	296	296

Table No. 3 Cost Trends of Electric Light and Power Construction, 1911 = 100

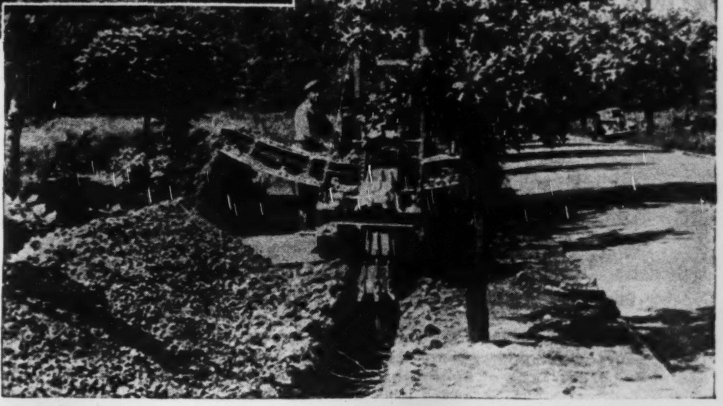
(Complete Index reports 50 items entering into Electric Light and Power Construction Costs) A relates to Total Constr. & Equip.; B to Electr. Plant — Steam; C to Sub-Sta. Equip.

Cl. of Constr. Mat'l, and Labor	Jan. 1, 1921	Sept. 1, 1921	Jan. 1, 1923	Jan. 1, 1924	July 1, 1924	Jan. 1, 1925	July 1, 1925	Jan. 1, 1926	July 1, 1926	Jan. 1, 1927	July 1, 1927	Jan. 1, 1928	July 1, 1928	Jan. 1, 1929	July 1, 1929	Jan. 1, 1930	July 1, 1930	Jan. 1, 1931	July 1, 1931	Jan. 1, 1932	July 1, 1932	Jan. 1, 1933	July 1, 1933	Jan. 1, 1934	July 1, 1934	Jan. 1, 1935	July 1, 1935	Jan. 1, 1936	July 1, 1936	Jan. 1, 1937	July 1, 1937	Jan. 1, 1938	July 1, 1938	Jan. 1, 1939	July 1, 1939	Jan. 1, 1940	July 1, 1940	Jan. 1, 1941	July 1, 1941	Jan. 1, 1942	July 1, 1942	Jan. 1, 1943	July 1, 1943	Jan. 1, 1944	July 1, 1944	Jan. 1, 1945
Atlantic Seaboard Division																																														
A	221	183	189	201	196	201	197	197	194	193	187	192	192	195	206	204	188	191	188	182	176	170	177	186	200	200	199	204	205	213	230	226	222	224	225	232	231	233	242	248	248	250	252	251	249	251
B	216	194	186	195	192	199	196	197	196	194	190	193	192	200	208	206	198	198	195	192	186	182	186	200	205	205	204	205	209	210	229	226	223	225	224	235	234	234	236	241	239	242	242	241	226	226
C	201	182	176	187	186	191	190	184	178	176	172	173	173	170	181	179	174	177	175	172	168	165	166	172	184	184	184	185	187	188	204	204	203	203	203	212	212	212	213	217	216	216	216	216	207	207
North Central Division																																														
A	210	176	179	193	189	194	192	190	187	187	182	186	186	189	199	199	184	188	187	186	174	172	179	187	195	195	194	199	199	209	224	222	216	219	218	222	221	222	232	235	238	238	239	239	237	238
B	197	179	171	185	185	189	189	189	188	188	185	188	187	195	202	203	195	197	199	199	186	186	189	203	204	203	202	204	205	209	227	225	222	224	223	225	224	224	229	229	231	231	231	230	216	216
C	184	167	162	178	179	182	184	178	171	171	168	169	169	167	177	176	172	177	179	181	169	169	171	176	184	184	184	184	184	187	204	203	202	203	202	203	203	203	206	207	209	207	207	207	198	198
South Central Division																																														
A	216	183	182	193	186	189	186	184	183	182	179	183	186	189	199	197	185	186	183	179	171	169	179	187	195	198	193	199	201	208	224	221	216	218	218	223	224	227	239	245	246	247	247	248	247	248
B	210	188	181	190	186	189	186	187	189	187	186	189	195	202	210	209	205	204	203	200	190	189	198	211	212	212	203	208	212	214	234	232	229	231	230	235	237	240	246	250	248	248	248	250	235	235
C	195	176	172	182	181	181	181	175	171	170	169	170	176	174	184	182	182	184	183	181	173	173	179	185	192	192	184	188	191	192	211	210	209	210	209	213	216	219	223	226	226	224	224	226	217	217
Plateau Division																																														
A	209	178	179	192	186	191	191	190	188	186	181	185	185	188	198	197	181	183	181	177	171	169	179	188	196	196	195	198	198	206	225	221	216	218	219	223	222	223	232	234	236	236	236	235	233	238
B	202	186	178	191	189	191	194	197	196	194	190	193	193	200	208	207	199	198	197	194	188	188	197	211	212	211	210	210	210	212	234	232	229	231	232	235	234	234	236	237	236	235	235	234	219	225
C	187	173	168	184	183	184	188	185	177	176	172	173	173	171	182	179	175	177	177	175	171	171	177	183	191	191	191	189	189	189	210	209	208	209	211	212	212	212	212	213	212	210	210	210	201	207
Pacific Division																																														
A	214	185	178	187	182	185	182	180	178	181	175	180	179	182	192	191	176	178	175	172	163	161	170	178	189	189	192	196	197	204	221	218	214	216	215	219	218	219	231	235	242	242	243	248	241	242
B	206	191	172	180	178	180	175	179	177	182	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

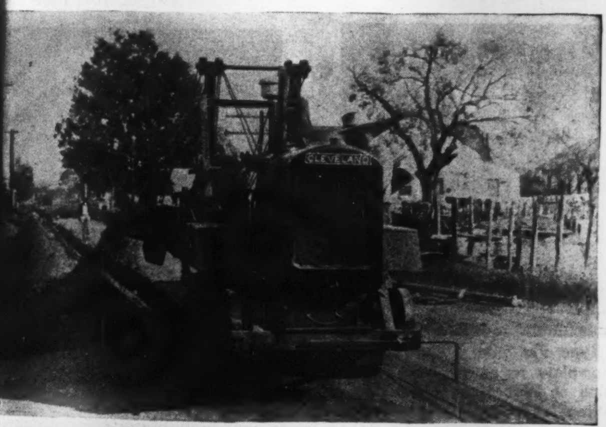
EPENDABILITY

Another "CLEVELAND" Characteristic—

Because of their correct design and superior Quality Construction insuring ruggedness, strength, stamina and power "CLEVELANDS" can be DEPENDED on to carry through on the toughest jobs, as demonstrated in the illustration at left.



use of their compactness, absence of
and dead weight, their quick shift con-
r and full crawler mounting "CLEVE-
DS" can be DEPENDED on to over-
quickly the many handicaps encount-
in digging Trench in congested areas.
in illustration at right how "CLEVE-
DS" travel along the tree lawn and
walk without damage and how easily
conveyor can be positioned to pass trees,
s or other obstacles . . .



"CLEVELANDS" because of their large number and wide range of speeds, their ease of mobility (truck or trailer) and their unsurpassed maneuverability can be DEPENDED on to get to the job and get the job done FASTER.

"CLEVELANDS" are backed by a DEPENDABLE Parts Service, so important to all machinery users. CLEVELANDS awareness of this vital service is shown by its maintenance of unexcelled parts service under present war conditions.

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"CLEVELANDS" Save More . . . Because they Do More

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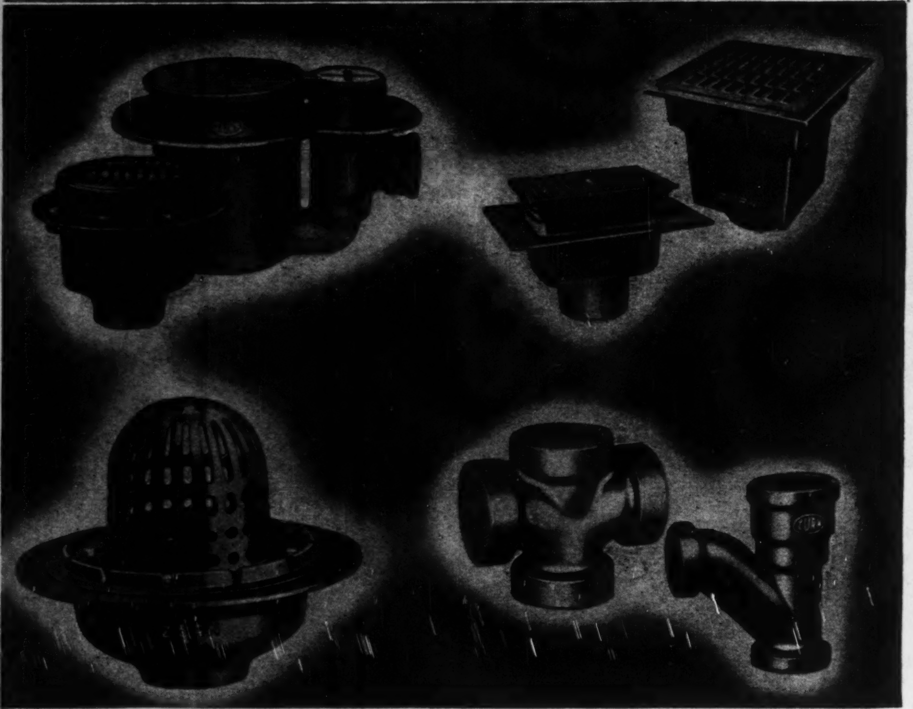
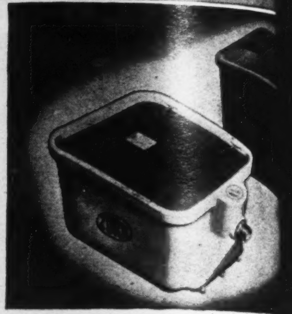
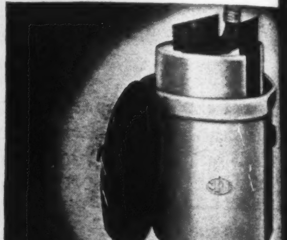


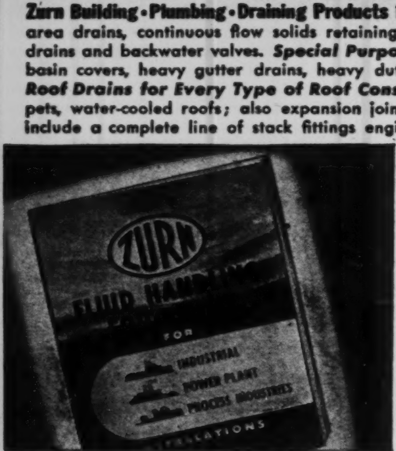
Zurn Building • Plumbing • Draining Products include ***Zurn Floor Drains,*** such as shower drains, floor and area drains, continuous flow solids retaining floor drains, basement floor and sub-soil drains, combination drains and backwater valves. ***Special Purpose Floor Drains*** include boiler house drains, industrial catch basin covers, heavy gutter drains, heavy duty industrial type floor drains, double duty area drains, etc. ***Roof Drains for Every Type of Roof Construction:*** flat roofs, inclined roofs, roof decks, gutters, parapets, water-cooled roofs; also expansion joints and stack flashing sleeves. ***Plumbing • Drainage Fittings*** include a complete line of stack fittings engineered for accuracy and alignment.



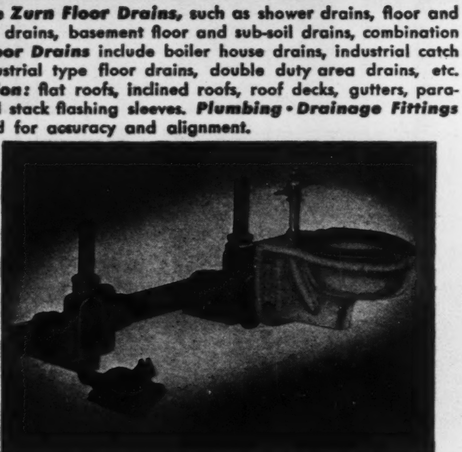
Interceptors for Wax, Grease, Fats,
similar substances which are to be sepa
waste water in order to prevent cloggi
age lines; two types of construction—
and V. G. E. (Vitreous Glazed Eart



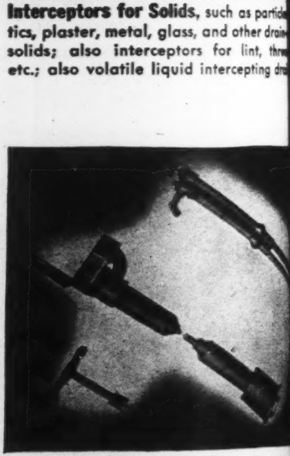
Interceptors for Solids, such as partic
tics, plaster, metal, glass, and other drai
solids; also interceptors for lint, thr
etc.; also volatile liquid intercepting dr



Fluid Handling Equipment includes high and low pressure pipe line strainers; safety vents, "Y" strainers, discharge check valves; remote valve control assemblies, etc. Write for Catalag No. 45.



Carriers for Wall Type Plumbing Fixtures and Closets includes complete range of types and the Zurn-Bennett line of Wall Hung Adjustable Closet Drainage Fittings and Carriers.



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ented compression valve, dry pipe hy
three different styles; also, compression v
pipe street washers.

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Boeckh Index of Construction Costs—U. S. Average, 1926–'29 = 100

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs. Brick and			Commercial & Factory Bldgs.		Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
ATLANTA AREA										
1926–29	82.7	87.0	84.2	83.7	87.0	82.9	94.5	84.7	87.5	86.8
1939	82.8	86.0	86.1	95.1	95.0	80.6	96.2	88.6	94.6	97.4
1940	88.1	90.3	90.6	96.8	97.3	86.3	100.1	91.5	97.3	98.4
1941	96.2	97.5	97.9	99.6	100.7	95.2	103.0	96.9	100.7	101.2
1942	102.5	102.8	102.8	104.4	105.1	101.1	106.3	101.4	105.1	104.9
1943	109.8	109.2	109.3	108.5	110.0	110.0	109.0	107.2	108.7	108.1
1944	124.5	123.2	123.5	117.3	120.0	126.1	117.2	120.7	118.2	117.2
BALTIMORE AREA										
1926–29	107.2	112.0	107.6	100.6	100.7	106.3	95.5	106.8	96.8	101.2
1939	93.5	95.5	95.6	99.3	99.2	94.0	101.7	96.6	101.4	100.2
1940	100.1	101.3	102.0	102.5	103.0	101.0	105.3	102.7	106.1	103.3
1941	109.2	109.9	110.4	107.4	108.1	111.2	108.3	109.7	110.8	108.2
1942	115.1	115.0	115.1	113.6	113.9	115.9	112.2	114.4	116.6	114.2
1943	120.8	121.3	121.7	118.9	118.8	122.6	115.6	120.6	120.8	119.4
1944	136.3	134.9	135.3	126.7	128.6	139.6	123.4	132.2	129.0	127.5
BIRMINGHAM AREA										
1926–29	91.7	96.7	94.1	95.5	96.8	90.2	97.5	94.6	96.3	96.3
1939	87.8	90.9	91.5	96.1	96.2	84.9	96.9	95.1	95.6	96.3
1940	92.4	94.0	94.5	95.2	96.0	91.4	97.8	97.7	96.5	96.7
1941	100.8	101.3	101.8	98.9	100.7	100.6	100.7	102.6	100.3	99.1
1942	108.4	110.8	110.6	110.7	111.0	108.7	107.8	111.3	110.6	112.5
1943	111.6	113.6	113.5	113.2	113.6	112.3	109.5	113.8	112.7	115.0
1944	124.6	125.1	125.2	119.7	121.7	125.5	114.6	124.1	119.0	120.9
BOSTON AREA										
1926–29	116.3	120.3	115.4	106.2	107.0	118.8	106.3	112.5	108.7	105.8
1939	106.2	110.4	110.1	116.3	113.7	105.7	114.2	111.5	118.2	118.5
1940	111.7	114.7	114.3	116.9	114.9	112.3	114.6	114.6	119.1	119.2
1941	121.3	122.4	122.2	118.1	117.6	123.4	115.9	119.3	121.1	120.2
1942	128.4	129.4	129.0	124.3	123.6	131.5	120.1	123.7	126.3	126.3
1943	135.2	135.7	135.2	130.0	129.0	139.0	124.3	130.7	132.0	132.5
1944	145.3	144.2	143.8	136.4	136.4	149.9	132.1	140.1	139.5	139.2
CHICAGO AREA										
1926–29	109.2	114.2	109.8	113.2	109.1	112.9	105.2	105.9	112.0	116.0
1939	110.6	112.5	111.1	123.6	118.7	114.2	117.6	109.3	122.6	127.6
1940	117.3	117.8	116.5	124.9	120.9	121.8	118.5	113.4	124.2	128.4
1941	126.9	125.5	124.3	126.9	124.1	132.9	119.9	118.9	126.6	129.6
1942	131.7	130.2	128.9	129.7	127.4	137.7	121.4	122.9	129.2	132.2
1943	137.8	136.2	134.8	134.7	132.0	143.9	124.0	128.9	133.7	137.0
1944	146.5	143.6	142.3	139.4	137.4	153.3	130.4	134.8	138.6	142.4
CINCINNATI AREA										
1926–29	100.5	105.0	101.3	101.0	100.2	100.2	99.6	103.1	100.6	101.0
1939	103.3	106.2	105.9	113.9	110.4	103.3	111.7	107.1	113.7	116.5
1940	105.9	108.6	107.8	116.0	112.4	105.9	112.3	108.9	114.5	119.2
1941	112.8	114.0	113.7	116.5	114.5	114.6	112.8	112.6	116.0	118.1
1942	117.1	118.4	118.1	120.6	118.8	118.5	115.5	116.9	119.9	122.1
1943	122.2	125.0	124.8	124.5	123.6	126.1	118.7	123.8	124.2	126.3
1944	139.1	139.5	139.6	133.0	133.9	141.6	127.2	138.0	134.6	134.7
CLEVELAND AREA										
1926–29	107.2	113.4	108.5	111.3	108.3	109.0	103.0	107.2	110.5	114.8
1939	106.2	109.6	109.5	115.3	112.8	107.5	112.9	109.5	117.7	118.0
1940	107.8	111.1	110.9	116.1	113.5	109.2	112.3	110.5	117.9	119.2
1941	118.3	120.5	120.1	122.6	120.2	121.7	116.9	118.2	124.1	125.9
1942	123.2	125.3	124.7	127.6	124.8	128.1	119.9	123.1	128.0	130.8
1943	128.6	130.0	129.4	130.3	128.1	131.9	122.0	127.0	130.3	133.2
1944	143.6	143.6	143.0	139.4	138.9	148.5	131.3	138.4	140.6	142.4
DALLAS AREA										
1926–29	103.1	107.3	103.2	98.9	99.1	103.6	100.5	100.9	99.4	99.7
1939	95.1	95.8	96.7	98.8	100.2	94.8	106.6	96.0	101.9	98.9
1940	100.7	100.7	101.8	101.1	103.3	100.9	112.8	100.5	106.6	100.6
1941	110.6	109.2	110.2	103.3	106.7	112.2	112.2	106.0	108.9	102.5
1942	117.9	115.9	116.8	110.8	114.5	119.7	118.5	111.3	116.8	109.4
1943	126.3	125.5	125.9	123.4	125.6	128.1	123.8	120.9	126.8	125.7
1944	129.2	128.2	128.5	123.6	126.5	131.7	126.8	123.2	126.7	124.4
DENVER AREA										
1926–29	95.0	99.7	95.5	102.4	99.6	95.5	105.5	94.6	101.4	108.0
1939	112.1	112.0	111.2	116.1	114.4	114.3	118.7	109.5	117.0	117.8
1940	110.6	111.8	111.3	117.1	115.1	111.9	119.9	111.4	118.4	119.8
1941	116.8	117.2	116.4	118.9	117.9	118.8	122.2	115.1	120.5	121.5
1942	121.8	121.8	120.4	122.5	121.9	124.2	125.1	118.7	124.2	124.9
1943	127.8	126.8	126.2	126.2	126.2	131.3	128.3	123.2	128.5	128.2
1944	139.1	137.4	137.3	132.5	134.9	142.5	133.6	133.3	135.4	132.8
DETROIT AREA										
1926–29	103.3	108.4	104.3	102.9	102.4	103.7	103.1	103.5	103.3	104.4
1939	98.8	102.7	102.9	108.6	107.5	98.7	108.8	104.2	111.4	110.1
1940	103.3	106.0	106.3	109.2	108.7	103.6	109.7	106.4	111.6	110.6
1941	113.4	114.6	114.7	114.7	114.1	114.8	112.3	113.1	116.6	116.3
1942	119.0	120.6	120.5	121.3	119.9	120.3	116.3	119.4	122.5	123.1
1943	126.7	127.9	127.6	126.5	125.4	129.4	120.1	125.9	127.4	128.6
1944	140.0	140.2	140.7	134.5	135.6	143.0	131.0	137.6	138.2	135.7
KANSAS CITY AREA										
1926–29	100.3	106.5	102.2	105.7	103.3	101.1	105.9	101.9	107.5	[illegible]
1939	104.4	109.9	109.8	118.3	115.4	103.8	117.2	113.0	120.0	[illegible]
1940	109.3	114.3	113.5	119.0	116.7	109.1	117.1	115.5	121.0	[illegible]
1941	117.8	120.4	120.2	120.8	119.6	119.1	119.3	120.2	123.5	[illegible]
1942	123.1	124.7	125.0	124.6	123.6	124.7	121.7	124.8	127.1	[illegible]
1943	127.7	128.0	127.9	128.0	127.5	129.7	123.8	128.0	129.9	[illegible]
1944	138.4	137.6	137.2	133.3	134.7	142.4	134.2	133.2	136.1	[illegible]
LOS ANGELES AREA										
1926–29	92.7	97.9	93.5	98.8	96.8	93.5	97.0	91.3	97.5	[illegible]
1939	93.6	97.2	97.5	103.7	105.0	95.6	109.5	96.8	106.2	[illegible]
1940	96.3	97.8	98.3	103.2	105.1	96.1	108.9	97.4	106.4	[illegible]
1941	107.5	106.7	107.6	106.5	109.6	108.4	113.8	104.2	112.4	[illegible]
1942	119.3	115.6	116.1	116.6	119.4	118.3	123.3	112.4	121.3	[illegible]
1943	123.7	122.6	122.8	122.6	125.0	127.0	128.8	118.0	127.5	[illegible]
1944	132.5	131.2	131.1	129.5	132.4	136.6	135.4	125.1	134.4	[illegible]
MINNEAPOLIS AREA										
1926–29	92.8	98.2	94.6	95.6	96.1	92.8	100.0	93.9	97.9	[illegible]
1939	101.9	105.0	104.2	113.5	110.7	102.7	113.4	103.6	114.5	[illegible]
1940	106.1	108.2	107.5	113.6	111.7	107.8	113.8	105.4	115.3	[illegible]
1941	116.6	116.9	116.2	116.4	115.9	120.0	115.8	112.3	118.7	[illegible]
1942	121.2	121.4	120.6	120.5	120.9	124.5	118.9	116.8	122.7	[illegible]
1943	126.0	125.4	124.6	123.2	122.9	130.5	121.1	120.0	125.5	[illegible]
1944	137.7	136.2	135.8	129.8	131.0	142.8	127.5	130.3	132.9	[illegible]
NEW ORLEANS AREA										
1926–29	93.3	96.3	93.4	86.5	90.6	93.3	93.7	91.5	89.5	90.5
1939	89.0	90.3	91.3	95.4	98.3	88.1	102.8	91.7	98.5	94.9
1940	97.3	97.4	98.1	100.3	102.2	97.3	104.7	97.9	101.6	99.3
1941	106.3	105.7	105.9	106.7	108.6	107.9	112.1	104.4	108.7	106.7
1942	110.6	109.9	110.3	110.7	113.0	114.0	118.0	108.0	114.6	111.2
1943	113.1	113.1	113.4	113.4	116.0	117.0	120.0	110.6	117.3	114.9
1944	124.6	122.3	122.6	117.7	122.7	128.5	124.6	117.7	122.1	117.1
PHILADELPHIA AREA										
1926–29	100.3	106.3	103.7	105.9	103.1	98.1	101.9	104.2	104.1	107.5
1939	99.2	102.6	102.9	105.7	104.1	98.2	102.0	105.0	105.5	106.7
1940	103.0	105.4	106.0	106.7	106.1	102.1	105.9	107.4	107.9	107.5
1941	113.3	114.0	114.4	111.7	111.6	113.9	109.1	113.6	113.0	111.8
1942	121.8	123.5	123.6	123.1	122.0	122.7	116.6	123.0	123.2	125.1
1943	127.6	129.0	129.2	127.2	126.7	128.6	119.6	127.4	127.1	127.5
1944	142.8	142.1	142.4	135.6	135.9	145.0	127.6	139.0	135.2	136.5
NEW YORK CITY AREA										
1926–29	133.3	138.4	131.9	122.8	120.4	137.5	113.1	127.4	123.2	125.3
1939	122.1	123.3	122.5	130.6	125.9	125.6	123.7	119.6	130.0	133.3
1940	124.6	125.7	125.1	132.0	127.4	128.0	124.3	122.2	131.2	134.9
1941	134.6	134.1	133.3	135.0	131.3	139.4	126.6	128.7	134.4	137.1
1942	140.7	139.1	138.2	137.9	135.6	145.0	128.5	132.6	137.1	139.3
1943	144.5	142.5	141.6	140.2	138.0	150.0	130.3	135.8	139.0	141.7
1944	154.3	153.1	152.7	149.6	147.7	159.8	139.8	147.2	149.6	152.6
PITTSBURGH AREA										
1926–29	113.2	118.8	112.8	111.2	107.1	115.4	89.6	112.2	104.6	112.0
1939	113.8	117.0	115.7	117.5	114.2	114.2	109.8	116.5	116.9	119.1
1940	115.0	117.3	116.7	117.7	114.4	115.6	109.5	117.4	116.2	119.3
1941	125.3	125.7	125.3	120.6	118.7	127.4	111.4	123.8	119.6	122.3
1942	132.7	131.1	130.6	126.0	124.4	133.9	115.4	128.6	124.8	127.6
1943	139.0	137.8	136.9	131.6	129.8	142.9	119.0	133.9	129.6	131.9
1944	149.1	147.3	146.4	138.3	137.0	153.3	125.4	142.6	136.6	139.3
ST. LOUIS AREA										
1926–29	118.6	121.1	115.7	109.9	108.8	121.8	103.3	111.7	107.7	109.3
1939	107.0	110.2	109.9	118.7	116.4	107.6	114.3	110.3	119.2	119.8
1940	109.2	111.9	111.6	119.2	117.0	109.9	113.4	111.6	119.2	120.3
1941	117.0	118.7	118.5	121.1	120.2	120.1	116.7	116.3	122.1	121.5
1942	123.3	124.5	124.1	126.9	125.9	126.3	120.9	122.3	126.9	128.6
1943	126.4	128.2	128.1	131.2	129.4	129.3	123.4	126.5	130.3	133.3
1944	138.4	138.4	138.3	135.7	136.3	142.1	129.8	136.4	136.6	136.7
SAN FRANCISCO AREA										
1926–29	87.7	93.7	90.4	97.5	96.5	86.1	95.5	95.5	91.8	99.0
1939	99.2	105.7	104.5	117.4	114.4	97.6	114.9	107.4	116.5	121.9
1940	100.7	106.0	106.0	116.4	114.1	99.6	112.2	108.1	115.7	120.4
1941	112.2	115.8	116.2	120.1	119.8	114.3	120.9	115.3	123.4	123.0
1942	120.1	123.6	123.4	127.5	127.5	121.1	127.2	123.7	130.8	129.3
1943	127.7	131.3	131.4	133.2	133.2	128.8	131.9	131.5	136.3	136.6
1944	137.1	139.4	139.5	139.4	139.7	139.0	137.1	138.4	142.4	142.8
SEATTLE AREA										
1926–29	84.5	92.2	89.2	101.7	95.1	82.4	100.8	92.2	100.5	105.9
1939	96.7	104.4	103.8	119.2	114.9	94.4	115.1	108.3	118.7	125.3
1940	99.0	106.2	105.5	119.1	115.1	97.2	112.8	109.4	117.7	124.9
1941	109.9	115.1	114.5	123.0	119.9	109.7	118.8	116.1	123.3	128.2
1942	121.5	122.7	122.3	131.7	128.6	116.5	129.2	124.2	133.4	136.7
1943	125.4	129.7	129.2	136.6	134.1	124.4	133.7	130.8	138.9	142.0
1944	135.0	139.3	138.7	144.6	142.3	135.7	140.9	139.0	147.2	149.1
WASHINGTON, D. C.										
1926–29	106.6	107.7	107.9	107.1	105.9	106.0	104.0	108.0	106.4	108.4
1944	140.5	139.4	139.3	134.8	134.2	143.5	127.8	134.9	134.9	135.0

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See page 92, Apr. 27, 1939, issue for 1913-1938 data of series for Atlanta, New York, St. Louis and San Francisco.

Current indexes are calculated upon an actual survey at source of local construction cost conditions. Material prices used are those paid by contractors to material dealers. Labor rates are current rates paid by contractors—certain corrections being made in certain areas for labor efficiency and labor shortage. Index includes construction overhead, sales taxes, compensation insurance and social security. The indexes have been primarily engineered to use as local cost conversion factors to construction cost data released by the Boeckh organization. Complete index formula is available in published form in "Bockh's Index Calculator Tables".

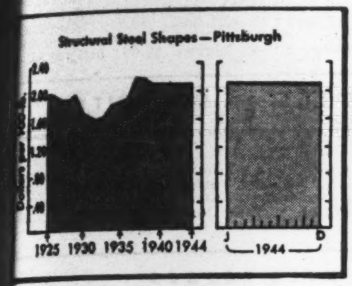
For definition of this index see p. 113

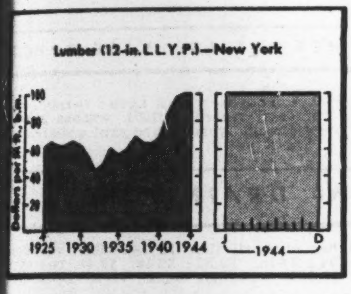
Prices of Construction Materials

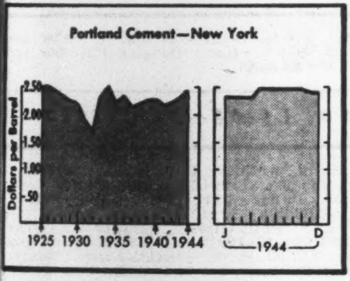
ONSTRUCTION MATERIAL price av-ages were generally higher in 44, although long-leaf yellow pine mbers, structural steel shapes, and st iron pipe prices were unchanged from their respective 1943 averages. Portland cement, not including cost of sacks, averaged $2.42 per barrel in New York City, an increase of 6.6 percent compared with 1943. The 20-cities' average price for 2x4-in. pine, $52.21 per M ft., b.m., climbed 13.7 percent over last year, and 2x4-in. Douglas fir, $54.21, was 4.6 percent above the 1943 *ENR* price average.

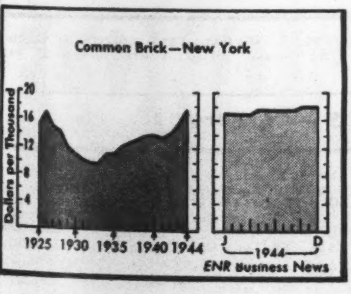
Common brick price average in New York was $17.46 per M in 1944, an increase of 10 percent over the $15.88 reported for 1943.

MATERIAL PRICE TRENDS









ENR Business News

Basic Building Materials Prices

1874 to 1944 in New York City

Average yearly prices at New York, except in the case of steel, which is f. o. b. Pittsburgh mill; wrought, iron I beams for years 1879, 1885 and 1886. Brick, wholesale, f. o. b. Lime, common lump, wholesale, f. o. b., 180 lb., net, 1910–15, incl.; afterward, 280 lb. Cement, net, delivered; *Rosendale, 1874 to 1878, incl.;* afterward, Portland. Lumber, No. 1 com., rough, wholesale, at dock, for 1 in., yel. pine, 1874 to 1909, incl.; afterward, 3 in., long-leaf to 1913, incl. *LLYP–3 x 12 — from Lumber Trade Journal. †LLYP–12 x 12 as reported to Engineering News-Record. Cast iron pipe price per ton f. o. b. Delaware River foundries; *prices prior to 1901 are for all classes of bell and spigot;* prices subsequent to 1901 are for 6 in. and larger Cl. B or heavier bell and spigot; early prices from "Price History of Cast Iron Pipe" by United States Cast Iron Pipe and Foundry Co.; prices 1850, $35.72; 1855, $40.18; 1860, $32.15; 1865, $58.05; 1870, $50.

	Brick Common per M	Cement Per Bbl.	Lime Per Bbl.	Pine per M. Ft. b.m		Steel Shapes, Per 100 Lb.	Cast Iron Pipe, Per Ton
1874	$7.41	*$1.48*	$1.50	$26.00		....	*$43.76*
1875	7.12	*1.25*	1.40	21.00		....	*37.51*
1876	5.87	*1.80*	1.00	21.00		....	*31.26*
1877	4.93	*1.10*	.80	20.00		....	*25.00*
1878	4.71	*.96*	.70	20.00		....	*23.22*
1879	4.08	2.70	.80	20.96		$2.78	*29.47*
1880	7.00	2.88	.87	19.00		....	*29.47*
1881	7.50	2.72	.95	19.00		....	*33.04*
1882	7.12	2.82	1.01	19.00		....	*35.68*
1883	8.28	2.75	1.05	19.00		....	*32.15*
1884	6.65	2.60	.95	19.00		....	*26.79*
1885	6.10	2.28	1.00	18.66		3.12	*25.00*
1886	7.51	2.28	1.00	19.00		3.00	*26.79*
1887	7.43	2.07	.82	19.00		....	*28.58*
1888	6.50	2.16	.83	16.75		....	*25.00*
1889	7.06	2.23	.92	20.31		....	*23.04*
1890	6.65	2.25	.95	21.75		....	*24.65*
1891	5.53	2.38	.87	18.00		....	*23.04*
1892	5.77	2.27	.93	18.50		....	*21.43*
1893	5.83	2.15	.93	18.50		....	*21.30*
1894	5.00	2.03	.85	18.50		1.20	*18.47*
1895	5.31	1.97	.78	16.92		1.35	*17.95*
1896	5.06	2.00	.69	16.42		1.60	*17.64*
1897	4.94	1.97	.72	16.44		1.24	*15.48*
1898	5.75	2.00	.70	15.75		1.27½	*15.48*
1899	5.69	2.05	.75	16.25		1.45	*21.17*
1900	5.25	2.16	.68	24.50		1.95	*22.33*
1901	5.77	1.89	.77	17.50		1.60	*21.63*
1902	5.39	1.95	.81	21.00		1.60	26.62
1903	5.91	2.03	.79	23.50		1.70	27.56
1904	7.50	1.67½	.80	21.50		1.60	22.92
1905	8.10	1.43	.89	24.92		1.62	26.54
1906	8.55	1.55	.05	29.33		1.60	30.12
1907	6.16	1.55	.95	30.50		1.75	31.52
1908	5.10	1.46	1.05	30.50		1.76	24.69
1909	6.39	1.41	1.05	33.04		1.50	24.19
1910	5.70	1.07	.75	24.00		1.46	22.99
1911	5.31	1.04	.75	24.63		1.36	19.99
1912	6.75	.97	.75	24.92		1.33	21.22
1913	6.75	1.18	.91½	* 25.04 †		1.50	21.96
1914	5.50	1.17½	.97	21.79	29.25	1.16	20.37
1915	5.50	1.00	.97	21.68	27.91	1.28	22.52
1916	8.00	1.32	1.50	27.60	31.58	2.45	30.25
1917	9.10	1.76	2.02	38.00	37.81	3.62	52.33
1918	10.98	2.48	2.16	46.68	43.33	3.00	58.68
1919	15.79	2.63	2.65	57.04	49.60	2.52	53.87
1920	18.00	3.52	3.15	71.17	66.50	2.45	71.77
1921	17.40	2.82	3.47	50.67	51.54	2.00	50.58
1922	16.91	2.43	2.79	49.41	51.83	1.70	46.42
1923	20.00	2.66	2.98	61.77	62.25	2.39	57.75
1924	18.00	2.50	2.88	55.17	59.00	2.19	54.33
1925	15.00	2.50	2.38	57.00	59.67	1.95	49.16
1926	17.00	2.50	2.18	60.33	62.17	1.93	48.50
1927	15.00	2.40	2.49	62.57	61.46	1.86	41.42
1928	14.00	2.30	2.30	63.33	61.34	1.87	35.92
1929	11.71	2.23	2.25	64.50	63.00	1.92	36.66
1930	10.88	2.19	2.25	64.33	60.64	1.71	37.00
1931	10.29	1.89	2.25	58.17	53.02	1.63	34.71
1932	9.75	1.62	2.25	39.91	41.33	1.56	30.58
1933	9.50	2.26	2.50	46.25	46.79	1.64	34.58
1934	10.87	2.48	2.50	57.17	58.92	1.78	41.00
1935	11.00	2.15	2.35	51.67	53.75	1.80	42.58
1936	12.00	2.26	2.80	56.75	57.75	1.84	43.00
1937	12.50	2.07	2.80	61.50	66.46	2.21	48.75
1938	13.10	2.12	2.80	59.33	62.75	2.18	48.33
1939	13.46	2.20	2.80	64.35	62.50	2.10	46.75
1940	13.50	2.20	2.68	67.39	65.46	2.10	49.00
1941	13.13	2.15	2.66	75.50	83.33	2.10	49.00
1942	14.17	2.20	2.80	85.61	98.33	2.10	49.00
1943	15.88	2.27	2.80	88.81	100.00	2.10	49.00
1944	17.46	2.42	2.80	89.92	100.00	2.10	49.00

INDEX NUMBERS OF WHOLESALE PRICES—BUREAU OF LABOR STATISTICS

(1926 = 100)	1944	1943	1942	1941	1940	1939	1968	1937	1936	1935
Building materials	115.5	111.4	110.2	103.2	94.8	90.5	90.3	95.2	86.7	85.3
Brick and tile	101.7	99.1	98.0	93.7	90.5	91.4	91.0	93.5	88.7	89.4
Cement	95.8	93.8	94.0	92.0	90.8	91.3	90.3	89.0	92.2	92.7
Lumber	152.7	141.3	133.0	122.5	102.9	93.2	87.4	99.7	87.0	81.8
Paint and paint materials	105.2	102.3	100.3	91.4	85.7	82.8	81.3	88.4	80.1	79.8
Plumbing and heating	92.2	90.7	95.4	84.8	80.4	79.2	78.5	78.8	75.0	68.9
Structural steel	107.3	107.3	107.3	107.3	107.3	107.3	111.0	113.2	95.0	92.0
Other building materials	103.1	102.0	103.5	98.3	93.3	90.3	92.7	99.1	90.2	90.1

MATERIALS AND LABOR PRICES—DECEMBER, 1944

Market quotations on construction materials and wage rates reported monthly by ENR correspondents

In December, 1944 prices were the same as those reported for April, 1945 in pages 212, 214, 216, 218 of this issue except as noted below:

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F.O.B. CITY

PORTLAND CEMENT: Baltimore: cloth, $2.53; paper, $2.28; bulk, $2.03. Los Angeles: cloth, $2.80; paper, $2.20. Cincinnati: bulk, $1.91. San Francisco: cloth bag price withdrawn in Dec., none quoted. Chicago: cloth, $2.70; paper, $2.45; bulk, $2.30. Dallas: cloth, $2.52; paper, $2.27; bulk, $2.07. Pittsburgh: cloth, $2.55; paper, $2.30; bulk, $2.10. Seattle: cloth, $2.95; paper, $2.75. Minneapolis: cloth, $2.90; paper, $2.65. St. Louis: cloth, $2.80; paper, $2.52. GRAVEL: Baltimore: 1½-in., $1.75; ¾-in., $1.75; Seattle: 1½-in., $1.00*o*; ¾-in., $1.00*o*. SAND: Baltimore: $1.25; Seattle: $1.00*o*. CRUSHED STONE: Baltimore: 1½-in., $1.75; ¾-in., $1.75. CRUSHED SLAG: St. Louis: 1½-in. $0.75*g*; ¾-in., $0.75*g*; New Orleans: no price shown in December. CONCRETE BLOCK: San Francisco: lt. wgt. aggr. $0.20*y*. READY-MIXED CONCRETE: Pittsburgh: $8.25; Baltimore: $7.35; Dallas: $6.20; Minneapolis: $7.35*j*; St. Louis: $8.00. CEMENT: Price bases at mill: Buffington, Ind., bagged, $1.90; bulk, $1.80; Hannibal, Mo., bagged, $1.90; bulk, $1.85; Steelton, Minn., bagged, $2.00; bulk, $1.95.

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F.O.B. CITY

GRANITE BLOCK: Cleveland: $118.90. WOOD BLOCK: Baltimore: $82.50*m*; Cleveland: $2.50. PAVING BRICK: Kansas City: $40.00; San Fra cisco: $40.00. PAVING ASPHALT: Boston: tank cars, $17.00; Cleveland: tank cars, $16.00; drums, $18.00. Atlanta: drums, $24.62*e*. ASPHALT BINDERS—FLUXES: Atlanta: drums, $0.1309*e*; Boston: tank car, $0.20; drums, $0.22. Philadelphia: $14.00, tank cars. CUTBACK ASPHALT: Atlanta: tank, $0.0802*he*; drums, $0.1348*h*; Boston: tank car, $25.00; Cleveland: drums, not quoted in Dec. ROAD OIL: Atlanta: $0.0676*e*; Boston: none quoted; Cleveland: $0.095. ASPHALT EMULSION: Atlanta: tank cars, $0.0826; drums, $0.1384. Boston: tank cars, $0.1125; drums, $0.1325; Cleveland: tank cars, $0.095; Birmingham: tank cars, $0.09.

IRON AND STEEL PRODUCTS—BASE MILL PRICES

WIRE NAILS: Birmingham, Chicago, Pittsburgh, Cleveland: $2.55; Pacific ports, $3.05. STANDARD AND LIGHT RAILS: Birmingham, Chicago, Pittsburgh: $40.00. RE-ROLLED RAILS: Birmingham, Chicago, Pittsburgh: $39.00 per gross ton.

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB. BASE PRICE

STRUCTURAL SHAPES: Detroit: $3.65‡. REINFORCING BARS: Detroit: $2.52‡, new billet and rail steel. EXPANDED METAL LATH: Detroit; diamond mesh, $25.00; Cleveland: standard ribbed, $21.00; Philadelphia: diamond mesh, $19.50; standard ribbed, $21.50. WELDED FABRIC REINFORCING: April prices on 6x6-in., No. 6&6 wires quoted on per 100 sq.ft. basis, no actual price change from square yard quotation in December. STEEL SHEET PILING: San Francisco: $3.85.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

CAST IRON PIPE: Minneapolis: $57.47; prices in all other cities except Montreal are $1.00 higher in April than in December. VITRIFIED SEWER PIPE: Cleveland: 8-in., $0.266*r*; 12-in., $0.4725*r*; New York: 8-in., $0.308; 12-in., $0.594; 24-in., $2.52; 36-in., $6.45. CONCRETE SEWER PIPE: Baltimore: 12-in., $0.55; 24-in., $1.80; Detroit: 12-in., $0.36; St. Louis: 24-in., $2.00*k*. WROUGHT STEEL PIPE: Discounts: Kansas City: 1-3-in., blk., 35.9%, galv., 46.4%, 3½-6-in., blk., 46.6%, galv., 59.9%.

LUMBER, TIMBER, PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

DOUGLAS FIR: Pittsburgh: 3x12-in. rough, $88.75; Montreal: timbers, $80.00; New York: boards, 1x6-in. to 2x10-in. $65 to $69.00. LONG LEAF YELLOW PINE: Detroit: 6x12-in. rough, $70.75. RAILROAD TIES: Montreal: 6″x8″x8′, treated, $0.95. PILES: Douglas Fir, New York shipping area: 12-2-6, 90 to 100 ft., $0.5575; 13-3-5, 91 to 100 ft., $0.5708; 14-2-6, 50 to 69 ft., $0.6263.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

STRUCTURAL CLAY TILE-PARTITION: Chicago: 3x12x12-in., $72.00; 4x12x12-in., $77.00; 8x12x12-in., $145.00; Philadelphia: 3x12x12-in., $85.30; 4x12x12-in., $91.00; 8x12x12-in., $170.50; New York: 3x12x12-in., $78.40; 4x12x12-in., $83.60; 8x12x12-in., $115.00*c*; St. Louis: 4x12x12-in., $95.00; Cleveland: 3x12x12-in., $71.25; 4x12x12-in., $76.20; 8x12x12-in., $125.50; Dallas: 3x12x12-in., $67.90; 4x12x12-in., $78.25; 8x12x12-in., $145.80. STRUCTURAL CLAY TILE-LOAD BEARING: New York: 8x12x12-in., $193.30*h*; 10x12x12-in., $238.80*h*; 12x12x12-in., $295.60*h*; Cleveland: 8x12x12-in., $150.60; 10x12x12-in., $201.90; 12x12x12-in., $231.15; Philadelphia: 8x12x12-in., $204.60; 10x12x12-in., $252.00; 12x12x12-in., $312.00; Dallas: 8x12x12-in., $174.96; 10x12x12-in., $227.62; 12x12x12-in., $281.72. BRICK, COMMON: Atlanta: $15.00; Kansas City, $16.50; Detroit: $22.25; Baltimore: $16.00; Philadelphia: $17.00. BRICK, STRAIGHT HARD: Atlanta: $18.04; Kansas City: $18.50; Detroit: $22.25; Baltimore: $20.00; Philadelphia: $20.00. LIME: Baltimore: hydrated finishing, $18.00; common hydrated, $13.00; Cleveland: pulverized, $3.50*w*.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

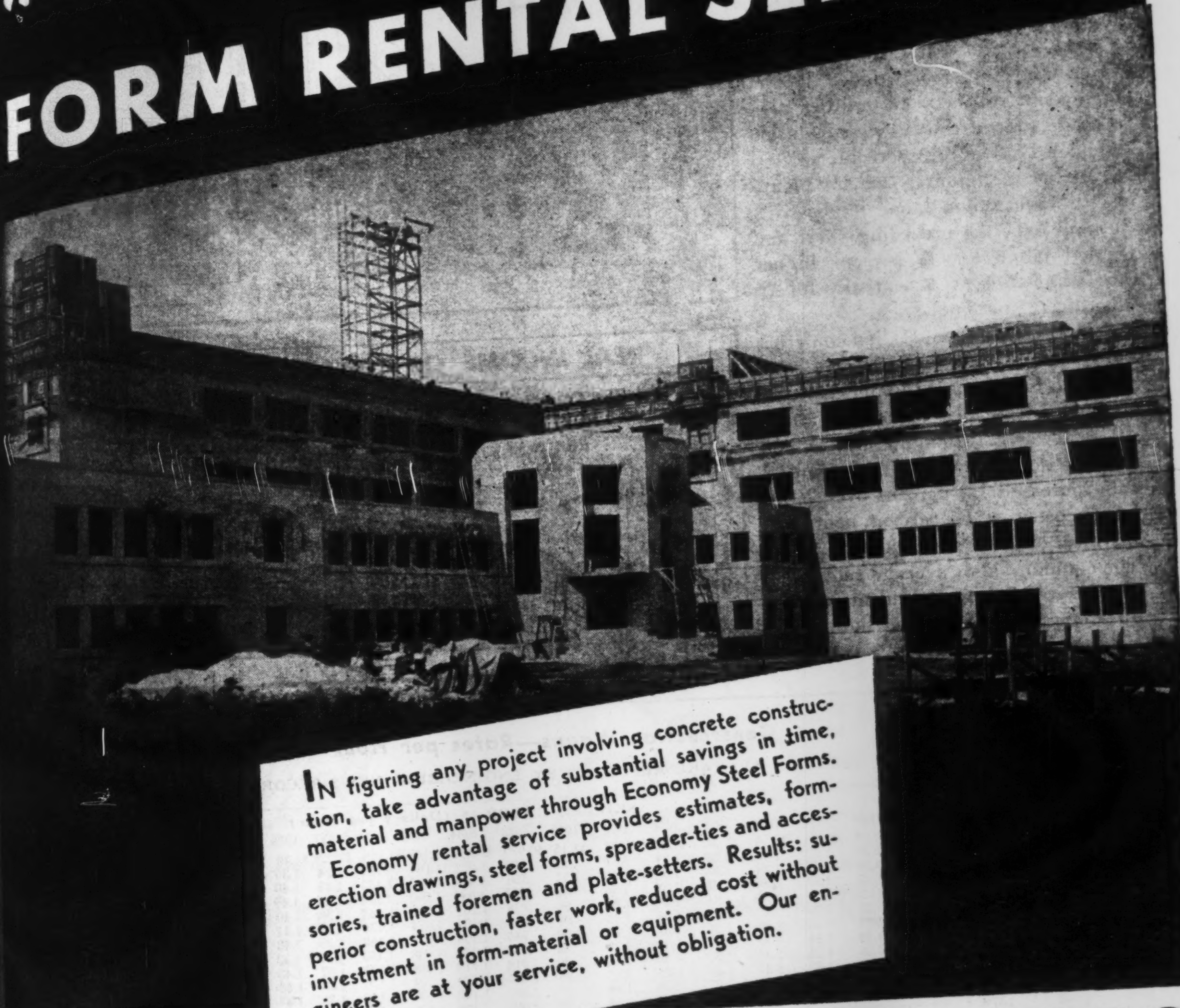
ROOFING SUPPLIES—SLATE SURFACED ROLLS: Kansas City: $2.10; St. Louis: $1.70; Cleveland: $1.93. ASPHALT-FELT ROLLS: St. Louis: $1.75; Cleveland: $1.83*h*. TAR-FELT: St. Louis: $1.75; Cleveland: $1.83*h*. ASPHALT COATING: St. Louis: $0.33; Cleveland: $0.25. TAR PITCH: St. Louis: $23.00; Cleveland: $27.00.

SKILLED AND COMMON WAGE RATES—PER HOUR

BRICKLAYERS: Cincinnati: $1.875; Kansas City: $1.65; New Orleans: $1.50. CARPENTERS: Cincinnati: $1.50; New Orleans: $1.25; Seattle: $1.565. STRUCT. IRONWORKERS: Cincinnati: $1.675; New Orleans: $1.50; Philadelphia: $2.00. HOISTING ENGINEERS: Cincinnati: $1.45/$1.60; New Orleans: $1.50; Philadelphia: $2.00. PLASTERERS: Baltimore: $1.50; Denver: $1.50*b*; Montreal: $1.05; Cincinnati: $1.625; Minneapolis: $1.625*e*; New Orleans: $1.375; Seattle: $1.865. COMMON LABOR, BUILDING: Baltimore: $0.75; Cincinnati: $0.85; New Orleans: $0.65; Philadelphia: $0.825; Detroit: $.90/$1.00. COMMON LABOR, HEAVY CONSTRUCTION: Baltimore: $0.75; Cincinnati: $0.85; New Orleans: $0.75; Philadelphia: $0.825; Cleveland: $1.15/$1.25; Detroit: $0.90. ENR LABOR RATE AVERAGES: Skilled labor, $1.641: Common labor, $0.890.

WHEN CONSTRUCTING ANYTHING WITH CONCRETE,

FORM RENTAL SERVICE



IN figuring any project involving concrete construction, take advantage of substantial savings in time, material and manpower through Economy Steel Forms.

Economy rental service provides estimates, form-erection drawings, steel forms, spreader-ties and accessories, trained foremen and plate-setters. Results: superior construction, faster work, reduced cost without investment in form-material or equipment. Our engineers are at your service, without obligation.

ECONOMY STEEL FORMS

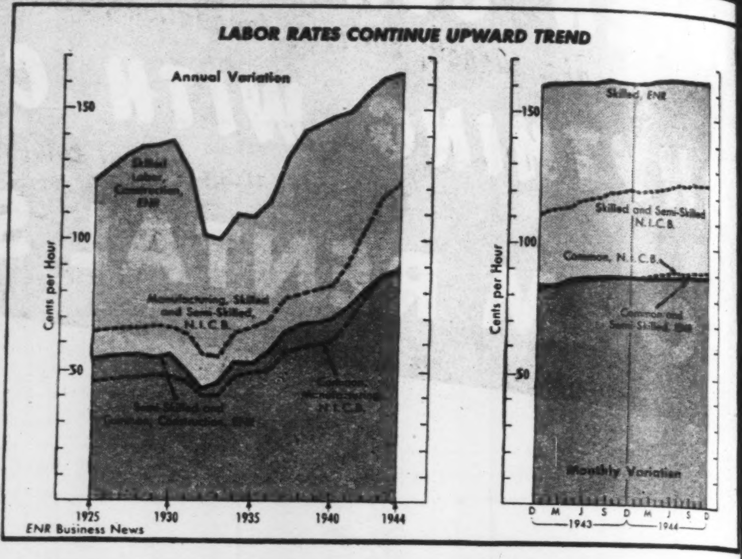
Construction Wage Rates and Trends

Common labor hourly rates for construction workers averaged 87.9c. in 1944, a record high, and 2.5 percent over the 1943 *ENR* 20-cities' average hourly rate. The common average rate opened the year at 86.9c., and by December had reached 89.0c.

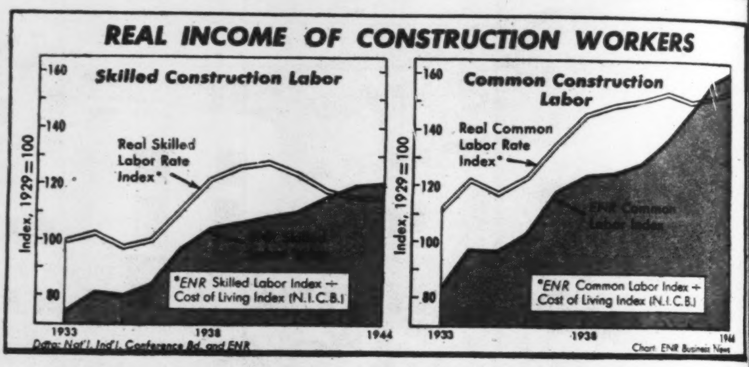
The skilled construction hourly rate average for the 20-cities was $1.620 in January 1944 and reached $1.641 in December, an average rate of $1.634 for the year. The December value was 1.3 percent higher than at the opening of the year, and the 1944 average topped the previous all-time high of 1943 by 1.2 percent.

The average hourly rate for manufacturing common labor increased 4 percent over the preceding year, and skilled labor was 5 percent higher according to N.I.C.B. statistics for 26 manufacturing industries.

The real income of skilled construction workers, that is the hourly rates adjusted for increased living costs, remained practically unchanged from 1943 levels. Although the skilled construction workers' average hourly rate increased 1.2 percent over 1943, living costs rose 1.1 percent, neutralizing most of the skilled workers' gains. The common labor average rate, however, rose 2.5 percent and more than offset the increase in the living cost reported by N.I.C.B.


LABOR RATES CONTINUE UPWARD TREND

ENR Business News


REAL INCOME OF CONSTRUCTION WORKERS

Data: Nat'l. Ind'l. Conference Bd. and ENR

Chart ENR Business News

Construction Wages—Rates per Hour

20-CITIES AVERAGE REPORTED BY ENGINEERING NEWS-RECORD

CONSTRUCTION WAGES

	Skilled Aver.†	Common
1910	$0.525	$0.179
1911	.534	.179
1912	.542	.182
1913	.555	.19
1914	.565	.177
1915	.57	.182
1916	.58	.192
1917	.61	.281
1918	.68	.38
1919	.78	.466
1920	1.05	.579
1921	1.06	.54
1922	1.01	.442
1923	1.10	.518
1924	1.19	.555

Notes:

†*ENR* Skilled Averages represents rates for bricklayers, carpenters, ironworkers.

(1) Skilled and Semi-skilled.

(2) Unskilled.

Both represent earnings per hour as reported by N. I. C. B.

*Checked monthly. Reported in first issue of *ENR* each month.

SKILLED LABOR †* (Dollars per Hour)

	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	[illegible]
J	$1.24	$1.28	$1.34	$1.35	$1.37	$1.37	$1.15	$0.989	$1.054	$1.108	$1.119	$1.22	$1.39	$1.43	$1.47	$1.47	$1.53	$1.61	$1.62	[illegible]
F	1.24	1.32	1.34	1.35	1.38	1.37	1.11	.996	1.062	1.104	1.119	1.24	1.39	1.43	1.47	1.47	1.54	1.61	1.62	[illegible]
M	1.24	1.32	1.34	1.35	1.38	1.36	1.11	.991	1.069	1.092	1.132	1.25	1.40	1.43	1.47	1.47	1.54	1.61	1.62	[illegible]
A	1.25	1.30	1.35	1.35	1.38	1.36	.95	.997	1.084	1.093	1.134	1.26	1.40	1.44	1.47	1.48	1.54	1.61	1.63	[illegible]
M	1.26	1.31	1.36	1.35	1.38	1.36	.96	.998	1.101	1.081	1.138	1.30	1.40	1.44	1.47	1.49	1.54	1.61	1.63	....
J	1.27	1.33	1.35	1.36	1.38	1.32	.99	.994	1.101	1.074	1.138	1.33	1.41	1.44	1.47	1.49	1.55	1.61	1.64	....
J	1.27	1.33	1.35	1.36	1.38	1.23	1.00	.985	1.104	1.077	1.159	1.35	1.43	1.44	1.48	1.50	1.56	1.62	1.64	....
A	1.28	1.34	1.35	1.37	1.39	1.19	.98	.986	1.110	1.088	1.159	1.37	1.43	1.44	1.48	1.50	1.59	1.62	1.64	....
S	1.28	1.34	1.35	1.37	1.39	1.19	.99	1.016	1.119	1.088	1.159	1.37	1.43	1.44	1.48	1.52	1.59	1.62	1.64	....
O	1.29	1.33	1.35	1.37	1.39	1.17	.98	1.029	1.120	1.104	1.176	1.38	1.43	1.44	1.48	1.52	1.59	1.62	1.64	....
N	1.29	1.34	1.35	1.37	1.39	1.16	.97	1.037	1.120	1.101	1.178	1.38	1.43	1.46	1.48	1.52	1.60	1.62	1.64	....
D	1.29	1.33	1.35	1.37	1.39	1.15	.98	1.062	1.120	1.101	1.180	1.39	1.43	1.46	1.48	1.52	1.60	1.62	1.64	....
Aver.	1.27	1.32	1.35	1.36	1.38	1.27	1.02	1.006	1.097	1.093	1.149	1.32	1.41	1.44	1.47	1.50	1.56	1.615	1.634	...
Mfg.(1)	.651	.656	.659	.668	.662	.634	.559	.55	.642	.662	.685	.78	.80	.81	.83	.916	1.044	1.163	1.225	....

COMMON LABOR * (Dollars per Hour)

	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	[illegible]
J	.54	.55¾	.55	.559	.5628	.5384	.4524	.4271	.5158	.5376	.547	.603	.680	.682	.685	.711	.776	.832	.869	[illegible]
F	.54	.55¾	.54¼	.564	.5628	.5428	.4521	.4285	.5268	.5241	.547	.603	.675	.680	.685	.713	.780	.832	.869	[illegible]
M	.54½	.56	.54¾	.5509	.5610	.5371	.4358	.4272	.5268	.5243	.547	.612	.675	.680	.685	.716	.780	.842	.870	[illegible]
A	.54¾	.56	.55	.529	.5646	.5359	.4122	.4343	.5343	.5255	.552	.612	.677	.683	.685	.725	.788	.858	.874	[illegible]
M	.55	.55¼	.55	.5315	.5628	.5394	.4105	.4442	.5343	.5233	.558	.627	.673	.682	.690	.741	.788	.863	.874	....
J	.55	.55¼	.55¾	.534	.5628	.5394	.4121	.4393	.5343	.5269	.564	.644	.677	.684	.703	.747	.796	.863	.877	....
J	.55¼	.55¼	.55¾	.5296	.5615	.4721	.4114	.4430	.5300	.5289	.563	.662	.677	.684	.707	.753	.803	.863	.882	....
A	.55¼	.55¼	.5607	.5353	.5615	.4634	.4220	.4430	.5300	.5285	.569	.668	.677	.685	.707	.753	.823	.869	.882	....
S	.55¼	.55¼	.5607	.5496	.5609	.4665	.4308	.4524	.5349	.5285	.569	.673	.677	.685	.711	.761	.823	.869	.883	....
O	.55	.54¾	.5628	.5496	.5596	.4584	.4308	.5057	.5363	.5285	.583	.676	.682	.685	.711	.761	.826	.869	.886	....
N	.55¼	.54¾	.5653	.5603	.5587	.4559	.4260	.5102	.5388	.5275	.583	.678	.682	.685	.711	.768	.832	.869	.886	....
D	.55¼	.55	.5628	.5653	.5503	.4534	.4273	.5202	.5413	.5275	.586	.678	.682	.685	.711	.769	.832	.869	.890	....
Aver.	.548	.554	.5558	.5465	.5607	.5002	.4269	.4562	.5319	.5276	.564	.645	.678	.683	.699	.743	.804	.858	.879	....
Mfg.(2)	.461	.472	.474	.486	.478	.461	.401	.401	.478	.494	.498	.568	.584	.594	.61	.682	.774	.854	.891	....

TIGER BRAND has earned its service stripes

Our ships, planes and mechanized fighting equipment have shown the world what American ingenuity can do when put to the test.

Wire rope, indispensable in the construction and operation of these implements of war, has taken on one unusual assignment after the other. Particularly is this true of American Tiger Brand.

Not only have our engineers provided the fighting forces with Tiger Brand to meet exacting requirements, but our shop forces, working around the clock, have turned out wire rope in quantities that would ordinarily have been thought impossible.

In making Tiger Brand for war, we have learned two important things—how to turn out high quality wire rope fast, from new and better steels—and how to adapt it successfully to many new uses.

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Excellay Preformed

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Export Company, New York

UNITED STATES STEEL

Wage Rates per Hour New York City

	Carpenters, 10 Hr. Day	Bricklayers, 8 Hr. Day	Masons' Laborers, 8 Hr. Day	Common Laborers, 10 Hr. Day	Structural Iron-Workers
1874	$0.23	$0.43	$0.18	$0.14	......
1875	.22½	.37	.18	.14	......
1876	.21	.31	.17	.14	......
1877	.20	.31	.15	.12	......
1878	.18	.31	.15	.11	......
1879	.17	.31	.16	.11	......
1880	.18	.34	.18	.12	......
1881	.19	.46	.21	.13	......
1882	.21	.50	.22	.15	......
1883	.21	.50	.23	.13	......
1884	.21	.50	.22	.13	......
1885	.20	.50	.22	.13	......
1886	.21	.50	.23	.13	......
1887	.21	.50	.20	.14	......
1888	.22	.50	.16	.12	......
1889	.22	.50	.23	.13	......
	8 Hr. Day			9 Hr. Day	
1890	.43	.47	.28	.14	......
1891	.43	.47	.28	.14	......
1892	.44	.50	.29	.14	......
1893	.43	.50	.30	.14	......
1894	.44	.50	.30	.14	......
1895	.43	.50	.30	.14	......
1896	.44	.50	.30	.14	......
1897	.44	.50	.29	.14	......
1898	.44	.50	.30	.14	......
1899	.45	.55	.33	.14	......
1900	.50	.56	.33	.14	......
1901	.50	.59	.33	.19	......
1902	.51	.65	.36	.17	......
1903	.56	.65	.36	.16	......
1904	.53	.65	.36	.19	......
1905	.54	.70	.36	.20	......
1906	.58	.70	.38	.21	......
				—8 Hr. Day—	
1907	.62½	.70	.37½	.22	$0.60
1908	.62½	.70	.37½	.22	.60
1909	.62½	.70	.37½	.22	.60
1910	.62½	70	.37½	.22	.62½
1911	.62½	.70	.37½	.22	.62½
1912	.62½	.70	.37½	.23	.62½
1913	.62½	.70	.37½	.22½	.62½
1914	.62½	.75	.37½	.22½	.62½
1915	.62½	.75	.37½	.25	.62½
1916	.62½	.75	.37½	.25	.66
1917	.69	.75	.42½	.30	.68
1918	.69	.81	.47	.40½	.80
1919	.75	.87½	.57½	.40½	.87½
1920	1.12½	1.25	.77½	.75	1.12½
1921	1.12½	1.25	.87½	.60	1.12½
1922	1.12½	1.25	.87½	.60	1.12½
1923	1.12½	1.50	.95	.61¼	1.12½
1924	1.31¼	1.50	1.00	.68¾	1.29
1925	1.31¼	1.50	1.00	.65½	1.46½
1926	1.45	1.64⅜	1.07	.81¼	1.60
1927	1.50	1.75	1.12½	.90⅝	1.75
1928	1.50	1.75	1.12½	.90⅝	1.75
1929	1.55	1.84	1.15	.98⅜	1.81
1930	1.65	1.92½	1.03⅛	1.03⅛	1.92½
1931	1.45	1.71½	1.02⅛	.65⅝	1.92½
1932	1.33	1.47	1.00	.64⅛	1.67½
1933	1.37½	1.57½	.91	.72⅛	1.65
1934	1.40	1.53	.82½	.84⅜	1.62
1935	1.40	1.50	.82½	.68	1.65
1936	1.40	1.50	.82½	.65	1.58
1937	1.60	1.73	.91	.76	1.79
	—7 Hr. Day—				
1938	1.75	1.88½	.99⅜	.91½	1.92½
1939	1.75	1.89½	1.03⅛	.91½	1.92½
1940	1.81	1.96	1.03⅛	.91½	1.96½
1941	1.85	2.00	1.03⅛	.93 1/16	2.00
1942	1.85	2.00	1.03⅛	.95	2.00
1943	1.85	2.00	1.03⅛	.95	2.00
1944	1.85	2.00	1.0885	.954	2.00
		1943 by months			
Jan.	1.85	2.00	1.03⅛	.95	2.00
Feb.	1.85	2.00	1.03⅛	.95	2.00
Mar.	1.85	2.00	1.03⅛	.95	2.00
Apr.	1.85	2.00	1.03⅛	.95	2.00
May	1.85	2.00	1.03⅛	.95	2.00
June	1.85	2.00	1.03⅛	.95	2.00
July	1.85	2.00	1.03⅛	.95	2.00
Aug.	1.85	2.00	1.03⅛	.95	2.00
Sept.	1.85	2.00	1.03⅛	.95	2.00
Oct.	1.85	2.00	1.03⅛	.95	2.00
Nov.	1.85	2.00	1.03⅛	.95	2.00
Dec.	1.85	2.00	1.03⅛	.95	2.00
		1944 by months			
Jan.	1.85	2.00	1.03⅛	.95	2.00
Feb.	1.85	2.00	1.03⅛	.95	2.00
Mar.	1.85	2.00	1.10	.95	2.00
Apr.	1.85	2.00	1.10	.95	2.00
May	1.85	2.00	1.10	.95	2.00
June	1.85	2.00	1.10	.95	2.00
July	1.85	2.00	1.10	.95	2.00
Aug.	1.85	2.00	1.10	.95	2.00
Sept.	1.85	2.00	1.10	.95	2.00
Oct.	1.85	2.00	1.10	.95	2.00
Nov.	1.85	2.00	1.10	.95	2.00
Dec.	1.85	2.00	1.10	1.00	2.00
		1945 by months			
Jan.	1.85	2.00	1.10	1.00	2.00
Feb.	1.85	2.00	1.10	1.00	2.00
Mar.	1.85	2.00	1.10	1.00	2.00
April	1.85	2.00	1.10	1.00	2.00

Index of Union Hourly Wage Rates in Each Building Trade (1939 = 100)

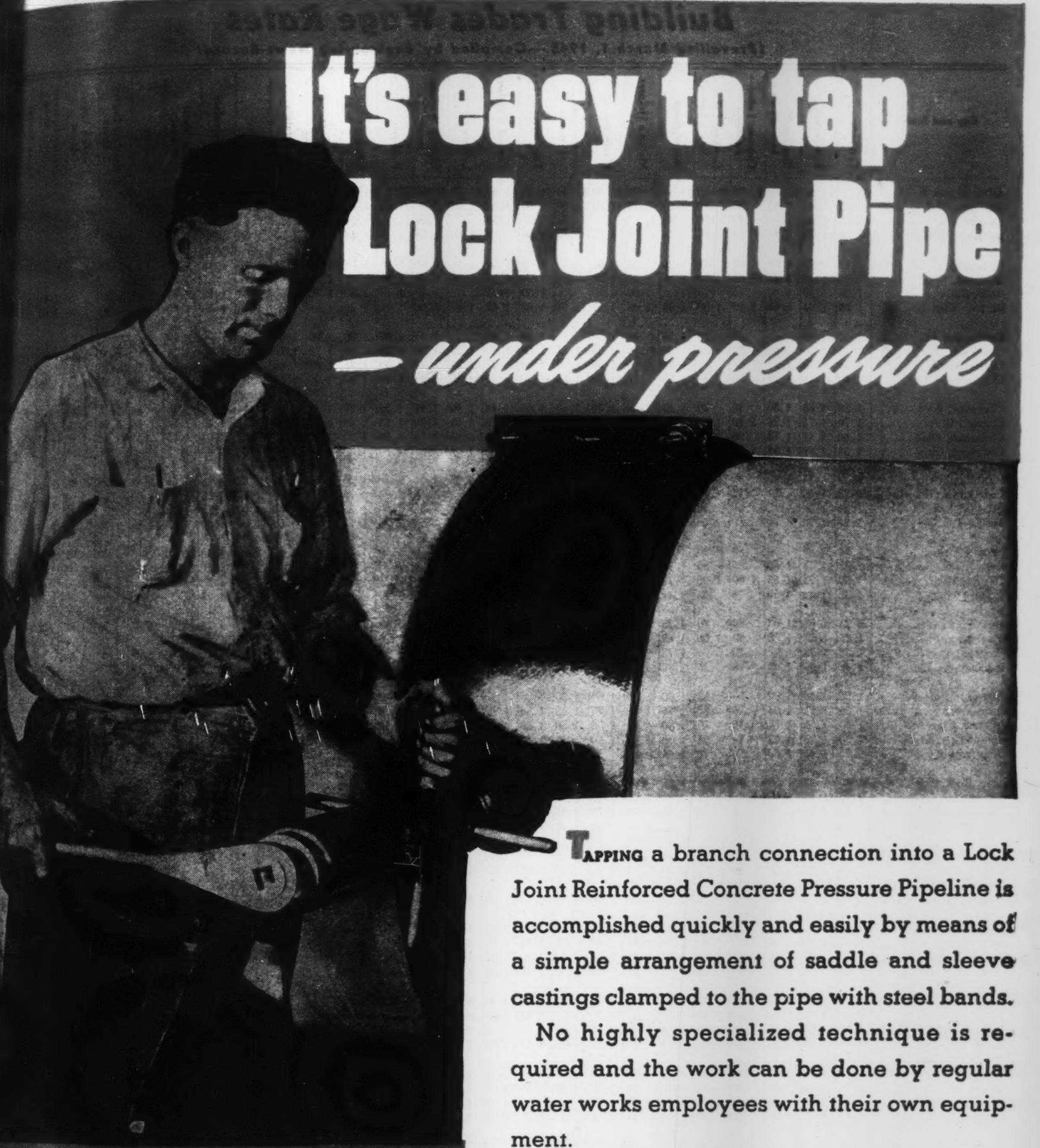
U. S. Bureau of Labor Statistics, Working Conditions and Industrial Relations Br
Industrial Relations Division

Year	All Building Trades	Journeymen	Helpers & Laborers	Bricklayers	Carpenters	Cement Finishers	Electricians (Inside Wiring)	Glaziers	Lathers	Painters	Plasterers	Plumbers & Gas Fitters	Sheet Metal Workers	Steam & Sprinkler Fitters	Stonemasons	Structural Ironworkers	Building Laborers
1907...	29.3	29.7	27.3	37.7	29.8	34.5	27.9	.....	.....	26.2	37.3	33.3	30.6	30.1	33.9	27.9	30.8
1908...	31.2	31.6	28.5	38.7	31.7	34.4	30.5	.....	.....	29.0	37.2	33.7	31.3	30.5	34.4	30.4	31.0
1909...	32.7	33.2	29.5	39.5	33.5	35.5	31.5	.....	.....	31.0	37.5	34.2	31.4	34.7	34.5	32.6	31.1
1910...	34.0	34.6	30.5	40.2	35.0	35.8	32.4	.....	.....	33.0	37.9	34.5	32.3	32.2	34.8	34.7	32.3
1911...	34.5	35.2	30.6	40.2	35.5	37.2	32.8	.....	.....	33.6	38.1	36.5	33.3	33.2	35.2	35.5	32.4
1912...	35.3	36.0	30.9	40.8	36.3	37.2	33.1	.....	33.8	34.0	38.9	36.7	34.1	33.8	35.5	36.1	32.7
1913..	36.1	36.9	31.8	41.5	36.8	38.0	33.8	.....	34.6	35.5	39.3	37.9	35.6	35.0	36.7	37.3	34.2
1914...	36.9	37.7	32.1	42.5	37.4	38.4	34.9	.....	35.2	36.7	39.4	38.4	36.9	35.7	37.8	38.0	34.5
1915...	37.2	38.0	32.4	42.6	37.8	38.8	35.6	.....	35.7	36.9	39.6	38.7	37.4	36.5	38.2	38.0	34.7
1916...	38.4	39.3	33.5	43.0	39.0	39.1	36.3	.....	36.7	40.3	41.0	39.0	38.0	37.2	38.8	38.6	36.3
1917...	40.8	41.5	36.8	44.5	42.4	41.4	38.7	.....	38.1	41.5	42.2	40.4	39.7	38.6	40.2	40.9	40.1
1918...	45.3	45.9	42.6	47.8	47.1	45.7	43.0	40.6	41.2	45.8	44.5	44.6	46.5	42.2	44.1	46.8	37.0
1919...	51.9	52.4	49.3	53.0	54.2	41.2	49.3	43.4	45.8	53.6	51.3	50.4	51.3	47.4	49.5	52.7	53.3
1920...	70.0	70.1	71.5	72.4	72.5	69.6	65.0	62.8	65.3	74.0	67.0	65.2	68.8	62.6	69.0	66.8	77.2
1921...	71.3	71.4	72.2	71.9	73.1	71.9	67.3	63.9	66.3	75.1	70.7	68.2	71.3	63.4	70.0	68.1	77.6
1922...	66.9	67.3	65.7	70.0	67.7	66.7	63.5	64.0	62.3	70.3	67.9	63.4	66.1	61.9	65.8	61.8	72.9
1923...	73.9	74.2	69.7	79.2	75.5	73.0	65.9	67.9	68.8	77.1	75.7	70.0	71.2	65.0	77.8	65.9	74.3
1924...	79.8	80.1	75.4	83.8	80.8	80.7	73.6	71.6	74.2	81.2	84.7	76.3	78.2	74.5	82.5	74.6	82.7
1925...	82.9	83.1	77.9	88.7	82.5	81.1	77.4	79.6	80.9	85.7	86.1	77.9	80.8	78.4	84.1	75.4	79.0
1926...	88.3	88.7	84.9	94.1	88.5	86.6	81.5	80.7	83.0	90.9	92.4	83.9	86.3	84.9	92.7	81.1	86.9
1927...	91.3	91.7	86.4	96.4	91.4	90.4	84.9	86.2	86.3	93.9	94.4	85.6	88.9	87.3	93.9	86.8	87.2
1928...	91.9	92.4	87.3	97.2	91.7	89.5	85.7	87.2	86.6	95.4	94.6	87.4	87.2	88.6	95.0	87.0	87.6
1929...	93.1	93.6	88.8	99.4	93.2	89.5	89.3	88.5	85.9	95.2	93.5	88.1	90.6	89.1	97.7	87.7	88.9
1930...	97.0	97.5	93.3	101.8	96.9	95.4	90.0	92.6	89.6	100.6	98.1	91.5	94.7	93.5	99.1	92.5	92.9
1931...	97.3	97.8	92.8	101.6	97.1	95.8	92.1	93.2	89.1	101.0	97.9	92.6	96.2	94.0	99.6	93.4	91.5
1932...	83.1	83.6	79.2	87.0	79.6	83.6	87.9	78.0	80.0	85.3	81.4	80.5	83.4	81.0	88.4	81.0	78.7
1933...	80.8	81.4	75.7	84.7	79.4	81.6	80.3	77.9	77.1	83.6	78.2	79.8	81.0	78.6	82.5	80.1	74.1
1934...	81.4	81.8	77.9	85.0	80.8	82.4	80.4	82.5	79.1	82.3	79.1	80.5	81.3	79.5	82.4	81.1	76.9
1935...	82.3	82.8	78.3	83.7	81.8	82.9	84.3	83.3	80.0	82.6	80.0	81.8	81.9	80.8	82.2	81.8	78.0
1936...	85.3	85.5	82.9	84.2	86.0	85.0	86.5	84.5	82.0	86.8	80.5	83.9	83.5	83.5	83.2	83.9	84.7
1937...	91.2	91.4	90.1	90.1	91.6	91.2	90.3	92.6	87.5	93.0	88.7	88.5	89.6	88.1	91.9	91.6	92.7
1938...	99.3	99.3	99.2	99.5	99.8	99.6	99.5	99.3	96.8	99.2	99.2	99.1	98.6	99.3	99.7	98.9	99.4
1939...	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100 0	100.0	100.0	100.0	100.0	100.0	100.0
1940...	101.6	101.4	102.0	102.2	102.5	100.9	101.7	101.4	100.7	100.2	100.5	101.6	101.8	100.3	99.5	100.4	101.6
1941...	105.3	105.0	106.8	104.6	104.8	104.5	106.3	104.3	104.5	106 9	102.2	106.0	106.5	103.4	102.1	105.2	107.6
1942...	111.9	110.9	117.5	108.3	112.1	110.8	113.5	108.8	109.1	110.5	105.0	110.5	116.0	109.3	108.0	108.7	119.6
1943...	112.7	111.5	118.9	108.7	112.5	112.0	113.8	109.6	109.2	112.4	105.2	110.9	116.4	109.9	108.4	109.1	121.3
1944...	113.6	112.4	120.3	110.0	113.4	113.1	114.7	110.2	110.0	113.5	105.9	111.5	117.2	110.5	108 0	109 8	122.9

Index of Union Weekly Hours in Each Building Trade (1939 = 100

Year	All Building Trades	Journeymen	Helpers & Laborers	Bricklayers	Carpenters	Cement Finishers	Electricians (Inside Wiring)	Glaziers	Lathers	Painters	Plasterers	Plumbers & Gas Fitters	Sheet Metal Workers	Steam & Sprinkler Fitters	Stonemasons	Structural Ironworkers	Building Laborers
1907...	124.3	123.8	126.1	122.9	121.0	122.7	124.2	.....	.....	131 1	125.8	120.6	117.0	120.3	118.4	121.3	121.6
1908...	122.4	122.0	123.5	120.3	119.2	121.6	123.3	.....	.....	131.0	125.2	120.7	116.9	120.3	118.4	118.9	121.6
1909...	120.7	120.5	121.0	117.8	117.8	112.5	122.5	.....	.....	129.2	125.2	120.7	116.9	120.0	118.4	117.3	121.2
1910...	119.2	119.1	118.8	115.6	116.4	122.3	121.8	.....	.....	127.5	125.1	120.5	116.9	119.3	116.6	116.0	118.3
1911...	118.8	118.7	118.6	115.1	115.8	121.1	121.6	.....	.....	126.7	125.8	120.2	116.6	119.2	115.8	115.8	118.3
1912...	118.4	118.3	118.3	115.1	115.7	121.1	121.2	.....	121.8	126.6	124.3	119.2	115.1	118.4	115.8	114.6	118.3
1913...	118.2	118.0	118.3	114.9	115.6	119.8	120.7	.....	121.8	125.9	124.3	119.2	114.9	118.0	115.7	114.1	118.3
1914...	117.7	117.7	117.6	114.4	115.1	119.0	120.3	.....	121.8	125.6	125.2	118.8	114.8	116.5	115.7	113.9	117.9
1915...	117.6	117.6	117.5	114.3	115.1	119.0	119.6	.....	121.2	125.6	123.6	118.8	114.6	116.5	115.6	113.9	117.9
1916...	117.2	117.1	117.2	114.1	115.1	117.2	118.6	.....	121.2	124.7	122.3	118.2	114.1	116.1	115.4	113.6	117.3
1917...	116.9	116.9	116.7	113.7	115.1	115.9	118.1	.....	120.6	124.6	122.2	118.1	114.0	116.0	115.3	113.4	116.0
1918...	116.3	116.2	116.3	113.7	113.9	115.3	117.3	118.0	120.6	124.0	121.9	117.1	112.8	114.9	115.3	113.0	115.5
1919...	115.7	115.7	115.2	113.5	113.2	114.4	116.3	118.0	120.3	123.8	121.9	116.7	112.3	114.8	114.6	112.8	113.3
1920...	115.1	115.2	114.5	113.4	113.3	113.8	116.0	117.5	119.6	120.2	121.6	116.7	111.9	114.7	114.6	112.8	112.1
1921...	115.0	115.1	114.5	113.4	113.2	113.8	116.0	118.0	119.3	120.3	121.3	116.5	111.9	114.6	114.7	112.8	112.1
1922...	115.0	115.2	114.2	113.4	113.3	113.7	116.0	118.1	119.4	121.2	121.4	116.5	111.8	114.6	114.6	112.8	111.3
1923...	115.1	115.3	114.4	113.4	113.7	113.7	116.0	117.5	119.8	120.9	122.0	116.5	111.8	114.6	114.6	112.8	112.1
1924...	115.1	115.3	114.4	113.3	113.5	113.7	115.9	117.5	119.6	120.8	122.1	116.5	111.8	114.6	114.3	112.8	111.8
1925...	115.1	115.3	114.2	113.2	113.5	113.4	115.9	117.1	119.2	121.1	121.7	116.5	111.8	114.6	114.3	112.5	111.9
1926...	114.9	115.1	113.9	113.3	113.5	113.4	115.9	116.5	118.9	120.7	118.2	116.5	111.8	114.4	114.5	112.8	112.1
1927...	114.7	114.8	113.9	112.7	113.5	113.0	115.9	117.9	118.3	120.2	117.7	116.2	111.4	114.2	114.3	112.8	112.3
1928...	114.0	114.0	113.8	112.7	112.9	112.4	115.3	117.4	117.7	117.0	116.7	116.2	111.1	114.2	114.2	112.7	112.2
1929...	113.0	113.3	111.5	109.8	112.9	112.5	112.6	116.1	117.1	116.7	115.6	115.2	111.0	113.6	110.9	112.2	112.1
1930...	109.8	110.0	109.0	107.1	109.4	108.1	109.9	112.4	110.4	115.4	113.0	109.9	106.9	108.5	107.1	108.8	110.0
1931...	108.5	108.5	108.1	105.5	107.7	106.9	108.8	110.5	109.8	114.4	112.1	108.4	105.1	107.4	105.2	107.5	108.7
1932...	106.5	106.6	105.7	103.1	105.0	105.6	106.2	107.9	109.3	114.2	110.0	108.0	103.6	106.4	104.8	104.8	104.9
1933...	106.2	106.2	105.2	104.2	103.4	107.6	106.2	107.9	108.8	114.0	112.4	107.5	103.5	105.8	104.0	104.5	104.5
1934...	102.3	102.3	101.9	102.4	102.5	103.7	99.9	102.3	102.5	99.9	107.6	106.5	102.0	105.1	103.5	103.0	99.9
1035...	101.5	101.5	101.2	102.3	102.0	103.5	95.8	101.6	102.3	99.8	105.9	105.8	102.1	104.8	103.4	101.8	99.8
1936...	101.5	101.5	101.4	102.3	102.1	103.0	96.2	102.0	101.3	100.2	104.2	104.4	102.0	105.0	103.4	101.7	100.3
1937...	101.9	101.9	101.8	103.3	101.9	103.1	100.9	102.1	102.7	100.2	104.3	105.0	102.1	105.1	103.4	101.2	100.6
1938...	100.2	100.1	100.2	100.0	100.0	100.0	100.3	100.2	100.8	110.4	100.0	99.7	100.0	99.6	100.0	100.1	100.1
1939...	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1940...	99.9	100.0	99.4	99.7	100.0	100.2	100.0	100.0	99.8	100.5	99.2	99.0	100.0	100.0	99.9	100.0	99.4
1941...	100.3	100.5	99.7	99.9	100.6	100.7	100.6	100.6	100.7	100.7	100.0	99.4	100.8	100.6	100.0	100.4	99.7
1942...	101.1	101.8	98.8	100.8	100.8	100.6	104.6	102.0	102.5	106.5	102.0	99.9	100.9	102.2	100.2	101.1	98.8
1943...	101.0	102.0	98.1	100.8	100.8	100.6	104.6	102.0	103.4	106.5	106.0	101.8	100.9	102.2	100.2	101.1	97.4
1944...	101.2	102.2	98.1	100.8	101.1	100.6	104.6	102.0	103.6	106.8	106.1	101.8	100.9	102.2	100.2	101.1	97.4

It's easy to tap Lock Joint Pipe —under pressure



Tapping a branch connection into a Lock Joint Reinforced Concrete Pressure Pipeline is accomplished quickly and easily by means of a simple arrangement of saddle and sleeve castings clamped to the pipe with steel bands.

No highly specialized technique is required and the work can be done by regular water works employees with their own equipment.

For further information on making connections under pressure to existing Reinforced Concrete Pressure Pipelines, you'll find the Lock Joint Pipe Company at your service.

LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

LOCK JOINT PIPE COMPANY
Established 1905
P. O. BOX 269, EAST ORANGE, N. J.
Denver, Colo. • Chicago, Ill. • Kenilworth, N. J. • Kansas City, Mo. • Rock Island, Ill.
Joplin, Mo. • Valley Park, Mo. • Cleveland, Ohio • Hartford, Conn. • Navarre, Ohio

SCOPE OF SERVICES *Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply Mains as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.*

Building Trades Wage Rates

(Prevailing March 1, 1945.—Compiled by Engineering News-Record)

City and State	Carpenters	Bricklayers	Structural Ironworkers	Common Labor—Buildings	Common Labor—Heavy Constr.	Stonemasons	Mason's Helpers	Plasterers	Mosaic and Terrazzo	Tile Layers	Cement Finishers	Lathers	Electric Workers (Inside)	Painters	Glaziers	Plumbers	Steamfitters	Roofers	Waterproofers	Sheet Metal Workers	Welders	Hoisting Engr.—1-Drum	Hoisting Engr.—2-Drum	Tractor Operator (Over 30-hp.)	Power Shovel Operator
Albuquerque, N. M.	$1.25	$1.50	$1.50	$ .75	$ .60	$1.50	$ .75	$1.50	$1.50	$1.50	$1.50	$1.25	$1.50	$1.25	$1.25	$1.50	$1.50	$1.50	$1.50	$1.50	†	$1.25	.....	$1.50	$1.63
Anderson, Ind.	1.33	1.64	1.65	.80	.95	1.65	1.05	1.63	1.50	1.65	1.38	1.63	1.50	[1]1.25	1.43	1.25	1.25	1.25	.....	.....	$1.65	1.60	$1.60	1.30	1.58
Atlanta, Ga.	1.25	1.50	1.50	.40	.50	1.58	.....	.....	.....	.....	1.50	.....	1.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Baltimore, Md.	1.44	1.75	1.80	.80	.80	1.75	.95	1.75	1.50	1.50	1.50	1.50	1.65	1.30	1.44	1.65	1.65	1.50	1.00	1.58	†	1.63	2.00	1.50	2.00
Birmingham, Ala.	1.25	1.75	1.63	.65	.65	1.25	.95	1.65	1.75	1.75	1.50	1.38	1.65	1.38	1.38	1.75	1.75	1.25	1.13	1.40	†	1.38	1.63	1.63	1.63
Bismarck, N. D.	1.25	1.40	1.25	.75	.75	1.25	.75	1.25	.....	.....	1.25	1.25	1.25	1.25	.....	1.25	.....	.....	.....	.....	1.25	.....	.....	1.25	1.25
Boise, Idaho	1.25	1.50	1.50	.75	.75	.....	1.00	1.50	.....	1.50	1.25	[2].....	1.50	1.13	1.50	1.50	1.50	1.13	1.13	1.25	1.45	1.25	1.45	1.45	1.75
Boston, Mass.	1.50	1.63	1.65	1.00	1.00	1.63	1.00	1.67	1.63	1.63	1.63	1.67	1.68	1.44	1.50	1.68	1.68	1.50	1.50	1.65	†	1.50	1.50	1.50	1.88
Burlington, Vt.	1.05	1.50	.....	.65	.60	1.50	.65	1.50	.....	1.50	1.50	.....	1.25	1.00	.80	1.00	1.00	.....	.....	1.00	.85	.....	.....	.....	.....
Charleston, S. C.	1.13	1.50	1.50	.50	.50	1.50	1.00	1.25	1.25	1.25	1.00	1.25	1.00	1.25	.85	1.75	1.75	1.00	1.00	1.13	1.50	1.00	1.25	1.00	1.50
Charleston, W. Va.	1.50	1.75	1.63	.75	.90	1.75	.90	1.50	1.50	1.50	1.25	1.38	1.63	1.50	1.25	1.63	1.63	1.38	1.25	1.38	1.63	1.37	1.63	1.38	1.63
Charlotte, N. C.	1.00	1.38	1.25	.50	.50	1.38	.70	1.50	1.50	1.50	1.25	1.25	1.25	1.00	1.00	1.50	1.50	.90	1.00	1.25	1.25	1.25	1.50	1.25	1.50
Cheyenne, Wyo.	1.29	1.65	1.50	.80	.80	1.65	1.10	1.50	1.65	1.65	1.44	1.50	1.44	1.29	1.29	1.44	1.44	1.44	1.44	1.44	1.44	1.15	1.44	.....	1.73
Chicago, Ill.	1.70	1.75	1.76	1.10	1.10	1.75	1.10	1.83	1.73	1.73	1.70	1.83	1.70	1.73	1.88	1.70	1.70	1.75	1.75	1.75	1.76	1.75	1.75	1.45	2.00
Cincinnati, Ohio	1.60	1.83	1.73	.90	.90	1.75	1.05	1.75	1.58	1.58	1.55	1.63	1.73	1.55	1.75	1.73	1.73	1.63	1.63	1.55	†	1.45	1.60	1.45	1.60
Cleveland, Ohio	1.58	1.88	1.88	1.04	1.04	1.88	.....	1.88	1.58	1.73	1.58	1.88	1.88	1.55	1.63	1.73	1.73	1.63	1.63	1.63	†	1.50	1.50	1.30	1.88
Columbus, Ohio	1.38	1.75	1.63	.80	.80	1.75	.95	1.65	1.25	1.25	1.44	1.55	1.50	1.38	1.25	1.58	1.58	1.38	1.38	1.50	1.63	1.38	1.50	1.15	1.63
Concord, N. H.	1.25	1.50	.....	.75	.75	1.50	.75	1.25	.....	.....	1.25	.....	1.25	1.00	.75	1.25	1.25	1.15	1.15	1.25	1.00	.....	.....	.....	.....
Conway, Ark.	1.25	1.50	.....	.40	.50	1.50	.60	1.50	.....	.....	1.50	1.50	1.38	1.00	.....	1.50	1.50	1.00	.....	.....	.....	.....	.....	.....	.....
Dallas, Tex.	1.25	1.70	[9]1.70	.80	1.00	1.70	.75	1.63	1.50	1.50	1.50	1.63	1.63	1.25	1.13	1.63	1.63	1.00	1.00	1.50	1.63	[3]1.38	[3]1.38	[3]1.38	[3]1.38
Denver, Colo.	1.50	1.65	1.50	.80	.80	1.65	1.10	1.65	1.65	1.65	1.50	1.65	1.65	1.50	1.38	1.65	1.65	1.50	1.50	1.50	†	1.50	1.63	1.50	1.63
Des Moines, Iowa	1.38	1.73	1.50	.85	.85	1.73	.85	1.50	1.73	1.73	1.38	1.43	1.50	1.33	1.25	1.55	1.55	1.10	1.10	1.50	1.55	1.45	1.45	1.50	1.50
Detroit, Mich.	1.50	1.73	1.83	1.00	1.00	1.73	1.15	1.73	1.50	1.73	1.50	1.73	1.85	1.50	1.44	1.75	1.75	1.95	1.50	1.55	†	1.83	1.83	1.83	1.63
Duluth, Minn.	1.30	1.44	1.50	.78	.78	1.44	1.00	1.50	1.44	1.44	1.15	1.35	1.40	1.25	.98	1.38	1.38	1.20	1.20	1.30	1.40	1.50	1.50	1.50	1.63
Fort Worth, Tex.	1.25	1.63	1.63	.60	.70	1.25	.75	1.68	1.38	1.50	1.50	1.68	1.25	1.13	1.50	1.50	1.50	1.25	1.25	1.50	[4]1.25	1.50	1.63	1.38	1.63
Harrisburg, Pa.	1.25	1.63	1.75	.80	1.00	1.63	1.04	1.50	1.65	1.63	1.50	.....	1.50	1.13	1.00	1.44	1.53	1.40	1.15	1.38	1.75	1.00	1.00	1.65	1.80
Houston, Tex.	1.38	1.73	.....	.70	.70	1.73	.75	1.63	1.58	1.58	1.50	1.63	1.63	1.25	1.25	1.63	1.63	1.50	.....	1.63	†	1.25	1.50	1.25	1.50
Indianapolis, Ind.	1.43	1.68	1.65	.88	1.25	1.65	1.05	1.63	1.38	1.50	1.38	1.50	1.63	1.43	1.43	1.63	1.63	1.33	1.38	1.47	1.63	1.60	1.75	1.30	1.60
Jackson, Miss.	1.25	1.50	2.00	.50	.55	1.50	.55	1.50	1.25	1.25	1.50	1.25	1.38	1.13	1.00	1.50	1.50	1.25	.....	1.25	1.25	1.13	1.38	1.25	1.38
Jamestown, N. Y.	1.38	1.75	1.63	.85	.85	1.75	1.00	1.73	1.38	1.38	1.50	1.75	1.40	1.15	1.50	1.38	1.38	1.40	1.50	1.25	1.38	1.59	1.59	1.25	1.75
Jefferson City, Mo.	1.13	1.50	1.75	.75	.75	1.50	1.00	1.75	1.50	1.50	1.50	1.13	1.25	1.15	1.15	1.50	1.50	1.25	.75	1.25	1.68	1.75	1.75	1.50	2.00
Kansas City, Mo.	1.50	1.75	1.63	.98	.98	1.50	1.13	1.70	1.45	1.58	1.55	1.63	1.65	1.50	1.63	1.70	1.70	1.38	1.38	1.65	†	1.55	1.68	1.43	1.68
Lexington, Ky.	1.25	1.65	1.60	.70	.70	1.65	.90	1.50	1.65	1.65	1.38	1.50	1.50	1.25	1.25	1.63	1.63	1.05	1.05	1.43	†	1.58	1.58	1.43	1.58
Little Rock, Ark.	1.25	1.25	1.50	.50	.60	1.50	.75	1.50	.....	.....	1.25	1.25	1.38	1.25	1.25	1.50	1.50	1.25	1.25	1.50	1.50	1.25	1.38	.....	.....
Los Angeles, Calif.	1.35	1.50	1.63	.88	.88	1.50	1.13	1.67	1.44	1.44	1.50	1.67	1.70	1.25	1.25	1.50	1.75	1.25	1.38	1.50	1.75	1.38	1.50	1.50	1.75
Meridian, Miss.	1.25	1.50	2.00	.50	.55	1.50	.55	1.50	1.25	1.25	1.50	1.25	1.38	1.13	1.00	1.50	1.50	1.25	.....	1.25	1.25	1.13	1.38	1.25	1.38
Milwaukee, Wis.	1.43	1.67	1.58	1.00	1.00	1.67	1.10	1.58	1.40	1.50	1.50	1.58	1.50	1.30	1.40	1.55	1.55	1.35	1.35	1.40	1.58	1.45	1.45	1.40	1.75
Minneapolis, Minn.	1.44	1.63	1.63	.95	.95	1.63	1.08	1.63	1.44	1.55	1.44	1.63	1.65	1.44	1.25	1.55	1.55	1.38	1.38	1.50	†	1.50	1.50	[6]1.50	1.63
Mobile, Ala.	1.38	1.63	1.50	.65	.75	1.63	.75	1.48	1.63	1.63	1.48	1.50	1.50	1.25	1.25	1.75	1.75	1.38	1.38	1.38	.....	1.25	1.50	.....	1.50
Nashville, Tenn.	1.25	.....	.....	.58	.58	.....	.....	.....	.....	.....	1.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.00	1.25	1.00	1.50
Newark, N. J.	2.00	2.00	2.00	1.25	1.25	2.00	1.25	2.00	2.00	1.75	2.00	1.90	2.00	1.75	1.56	1.75	1.75	1.75	1.75	1.90	2.00	2.00	2.25	1.38	2.00
New Orleans, La.	1.38	1.63	1.63	.70	.80	1.63	.85	1.50	.....	.....	1.38	1.63	1.63	1.15	1.31	1.58	1.58	1.15	1.15	1.30	†	1.30	1.55	1.38	1.55
New York, N. Y.	1.85	2.00	2.00	1.10	1.00	1.90	1.21	2.00	1.75	1.75	1.85	2.10	[10]2.00	1.80	1.89	2.00	2.00	2.00	1.70	2.00	†	2.00	2.00	.....	2.25
Ogden, Utah	1.38	1.63	1.50	[7].88	[8]1.00	1.63	1.13	1.65	1.38	1.38	1.30	1.50	1.50	1.25	1.13	1.50	1.50	1.25	1.25	1.38	1.50	1.38	1.50	1.75	1.65
Oklahoma City, Okla.	1.25	1.63	1.75	.85	.65	1.50	1.00	1.50	1.50	1.50	1.63	1.25	1.75	1.25	1.75	1.75	1.75	1.25	1.25	1.50	1.38	1.50	1.63	1.25	1.50
Omaha, Nebr.	1.34	1.58	1.58	.70	.70	1.58	.85	1.58	1.38	1.38	1.45	1.58	1.50	1.20	1.20	1.50	1.50	1.10	1.10	1.25	†	1.25	1.25	1.25	1.50
Philadelphia, Pa.	1.58	2.00	1.90	.90	.90	1.50	.....	2.00	1.65	1.63	1.55	2.00	1.88	1.50	1.50	1.75	1.75	1.50	1.50	1.70	†	2.25	2.25	1.65	1.93
Phoenix, Ariz.	1.35	1.65	1.50	.88	.90	1.65	1.00	1.73	1.65	1.65	1.44	1.50	1.50	1.25	1.25	1.50	1.50	1.25	.....	1.25	1.38	1.38	.....	1.50	1.75
Pittsburgh, Pa.	1.75	1.90	1.75	1.00	.90	1.63	1.10	1.88	1.50	1.57	1.75	1.88	1.75	1.63	1.61	1.75	1.75	1.63	1.75	1.63	1.20	1.75	1.81	1.50	1.81
Portland, Ore.	1.38	1.73	1.65	.95	.95	1.73	1.30	1.73	1.35	1.50	1.38	1.63	1.50	1.32	1.44	1.73	1.73	1.44	1.44	1.44	1.65	1.45	1.70	1.40	1.45
Raleigh, N. C.	1.00	1.50	1.50	.50	.50	1.50	.60	1.38	1.38	1.50	1.10	1.25	1.25	1.25	.....	1.50	1.50	1.00	1.00	1.00	†	.90	1.25	1.00	1.00
Reno, Nev.	1.50	2.00	1.75	.90	.90	1.50	1.00	1.75	.....	.....	1.50	1.75	1.63	1.50	1.50	1.63	1.63	1.50	.....	1.50	†	.....	.....	1.50	1.60
Richmond, Va.	1.15	1.63	1.50	.60	.60	1.63	.70	1.50	1.38	1.38	1.25	1.50	1.50	1.20	1.25	1.50	1.50	1.25	.....	1.25	1.50	1.25	1.50	1.25	1.50
St. Louis, Mo.	1.50	1.75	1.75	1.00	1.00	1.50	1.00	1.75	1.50	1.50	1.58	1.75	1.75	1.50	1.63	1.63	1.63	1.75	1.50	1.63	1.50	2.00	2.00	1.50	2.00
St. Paul, Minn.	1.44	1.63	1.63	.95	.95	1.63	1.08	1.63	1.44	1.55	1.44	1.63	1.05	1.44	1.25	1.55	1.55	1.38	1.38	1.50	†	1.50	1.50	[6]1.50	1.63
Salt Lake City, Utah	1.38	1.63	1.50	[7].88	[8]1.00	1.63	1.13	1.65	1.38	1.38	1.30	1.50	1.50	1.25	1.13	1.50	1.50	1.25	1.25	1.38	1.50	1.38	1.50	1.75	1.65
San Antonio, Tex.	1.13	1.50	1.50	.70	.60	1.50	.70	1.50	1.50	1.50	1.50	1.50	1.25	1.25	1.25	1.63	1.50	1.25	.....	1.50	†	1.38	1.50	1.25	1.50
San Diego, Calif.	1.35	1.50	1.63	.88	.88	1.50	1.13	1.63	1.50	1.50	1.50	1.63	1.70	1.35	1.35	1.50	1.50	1.38	1.50	1.44	1.75	1.38	1.38	1.50	1.63
San Francisco, Calif.	1.50	1.88	1.75	1.00	1.00	1.88	1.40	1.75	1.50	1.50	1.50	1.75	1.70	1.50	1.40	1.70	1.70	1.50	.....	1.50	†	.....	.....	.....	.....
Santa Fe, N. M.	1.25	1.50	1.50	.75	.60	1.50	.75	.150	1.50	1.50	1.50	1.25	1.50	1.25	1.25	1.50	1.50	1.50	1.50	1.50	†	1.25	.....	1.50	1.63
Seattle, Wash.	1.55	1.85	1.75	1.15	1.15	1.85	1.40	1.85	1.60	1.60	1.55	1.75	1.75	1.55	1.50	1.75	1.75	1.55	1.50	1.70	1.75	2.00	2.00	1.70	2.00
Springfield, Ill.	1.50	1.75	1.75	1.00	.90	1.75	1.15	1.75	1.75	1.70	1.50	1.63	1.60	1.50	1.50	1.70	1.70	1.40	1.40	1.61	†	1.35	1.75	1.50	1.75
Syracuse, N. Y.	[9]1.44	1.73	[9]1.68	[5].86	.....	1.73	.....	[9]1.63	.....	.....	1.44	1.63	.....	[9]1.27	.....	.....	.....	.....	.....	.....	.....	1.65	2.00	.....	.....
Tacoma, Wash.	1.48	1.75	1.68	1.10	1.40	1.75	1.10	1.73	1.50	1.50	1.50	1.60	1.68	1.44	1.38	1.68	1.68	1.44	.....	1.58	†	1.75	1.75	1.50	2.00
Toledo, Ohio	1.58	1.80	1.80	1.00	1.00	1.80	1.05	1.75	.....	1.60	1.73	1.75	1.75	1.50	1.33	1.73	1.73	1.50	1.73	1.50	†	1.63	1.73	1.48	1.73
Topeka, Kan.	1.15	1.65	1.63	.60	.60	1.65	.75	1.58	1.38	1.38	1.44	1.38	1.38	1.15	1.13	1.50	1.50	1.25	.....	1.50	†	1.38	1.50	1.00	1.50
Trenton, N. J.	1.68	1.78	2.00	.93	.93	1.78	.93	1.78	1.78	1.78	1.78	1.90	2.00	1.50	1.50	1.75	1.75	1.60	1.60	1.75	†	2.15	2.15	2.15	2.15
Tulsa, Okla.	1.38	1.63	1.68	.70	.60	1.63	.80	1.63	1.63	1.63	1.50	1.50	1.50	1.38	1.50	1.50	1.63	1.25	1.25	1.38	1.50	1.15	1.38	1.38	1.38
Washington, D. C.	1.70	1.90	2.00	.90	.90	1.75	1.10	2.00	1.65	1.65	1.60	1.75	2.00	2.00	1.65	1.88	1.88	1.75	1.62	1.75	1.50	1.75	2.00	1.50	2.00
Wilmington, Del.	1.38	1.83	1.90	.75	.75	1.83	1.10	1.63	1.38	1.40	1.50	1.50	1.75	1.33	1.33	1.60	1.60	1.50	.....	1.63	†	1.65	1.65	1.65	1.93

Note: Hourly rate figures are rounded to closest cent where fractional parts of cent are quoted. † Welders' rate same as trade in connection with which they work. [1] Spray $1.57½ [2] 10c. per yd. [3] Negotiating for increase to $1.50. [4] Ranges from 80c. to $1.25. [5] Range 82½c. to $1.05. [6] Range $1.00 to $1.50. [7] Negotiating for increase to minimum of 90c. [8] Range 90c. to $1.00. [9] Negotiating for increase. [10] Wood lathers.

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Yearly Average WAGES OF SIX BUILDING TRADES in Seven Cities

Bricklayers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913......	$0.65	$0.70	$0.75	$0.70	$0.70	$0.875	$0.75
1914......	.65	.75	.75	.70	.75	.875	.75
1915......	.65	.75	.75	.70	.75	.875	.75
1916......	.65	.75	.75	.70	.75	.875	.75
1917......	.70	.75	.75	.70	.75	.875	.81
1918......	.80	.81	.75	.875	.85	1.00	1.00
1919......	.80	.875	.875	.875	1.00	1.125	1.125
1920......	1.00	1.25	1.25	1.00	1.25	1.25	1.25
1921......	1.00	1.25	1.25	1.00	1.25	1.25	1.125
1922......	1.00	1.25	1.10	1.00	1.25	1.25	1.125
1923......	1.25	1.50	1.10	1.125	1.50	1.375	1.25
1924......	1.25	1.50	1.35	1.125	1.75	1.25	1.25
1925......	1.25	1.50	1.50	1.25	1.75	1.25	1.35
1926......	1.35	1.645	1.56	1.25	1.75	1.25	1.375
1927......	1.40	1.75	1.625	1.25	1.75	1.375	1.375
1928......	1.42	1.75	1.625	1.45	1.75	1.375	1.4275
1929......	1.50	1.84	1.65	1.50	1.75	1.375	1.50
1930......	1.50	1.925	1.70	1.50	1.75	1.375	1.50
1931......	1.50	1.7125	1.70	.8125	1.75	1.375	1.1875
1932......	1.105	1.47	1.40	.825	1.50	1.175	.975
1933......	1.10	1.575	1.406	.812	1.50	1.125	1.01
1934......	1.12	1.53	1.50	1.00	1.50	1.50	1.30
1935......	1.20	1.50	1.50	1.00	1.50	1.50	1.00
1936......	1.28	1.50	1.50	1.00	1.50	1.50	1.00
1937......	1.50	1.725	1.62	1.33	1.50	1.60	1.54
1938......	1.50	1.886	1.70	1.50	1.50	1.75	1.60
1939......	1.50	1.893	1.70	1.50	1.50	1.75	1.60
1940......	1.50	1.96	1.70	1.49	1.50	1.75	1.60
1941......	1.50	2.00	1.70	1.448	1.396	1.75	1.6375
1942......	1.573	2.00	1.721	1.75	1.563	1.771	1.715
1943......	1.625	2.00	1.75	1.75	1.75	1.802	1.764
1944......	1.625	2.00	1.75	1.75	1.75	1.875	1.829

Hodcarriers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913	$0.35	$0.375	$0.40	....	$0.4875	$0.50	[illegible]
1914	.35	.375	.40	....	.4875	.50	[illegible]
1915	.35	.375	.40	....	.4875	.50	[illegible]
1916	.35	.375	.425	....	.4875	.50	[illegible]
1917	.40	.425	.45	....	.4875	.50	[illegible]
1918	.425	.47	.50	....	.51	.625	[illegible]
1919	.50	.575	.575	....	.6375	.75	[illegible]
1920	.70	.775	1.00	....	.70	.93	[illegible]
1921	.70	.875	1.00	....	.85	1.00	[illegible]
1922	.70	.875	.725	....	.85	.71	[illegible]
1923	.70	.95	.725	....	1.00	.77	[illegible]
1924	.82	1.00	.725	$0.385	1.20	.8125	[illegible]
1925	.7625	1.00	.825	.6075	1.20	.8125	[illegible]
1926	.77	1.07	.88	.625	1.20	.8125	[illegible]
1927	.79	1.125	.925	.625	1.20	.875	[illegible]
1928	.805	1.125	.93125	.52	1.20	.875	[illegible]
1929	.85	1.15	.93	.50	1.20	.875	[illegible]
1930	.85	1.03125	.975	.50	1.20	.875	[illegible]
1931	.85	1.025	.975	.35	.875	.875	[illegible]
1932	.70	1.00	.825	.40	1.00	.70	[illegible]
1933	.70	.91	....	....	1.00	.70	[illegible]
1934	.70	.825	.825	....	.875	.70	[illegible]
1935	.70	.825	.825	....	.875	.70	[illegible]
1936	.77	.825	.95	.30–.40	.875	1.00	[illegible]
1937	.85	1.14	1.025	.40	1.00	1.10	[illegible]
1938	.85	1.14	1.025	.40	1.00	1.25	[illegible]
1939	.85	1.14	1.025	.40	1.00	1.25	[illegible]
1940	.85	1.186	1.025	.40	1.00	1.25	[illegible]
1941	.85	1.214	1.025	.4583	1.00	1.25	[illegible]
1942	1.00	1.214	1.063	.65	1.075	1.25	[illegible]
1943	1.00	1.214	1.063	.65	1.15	1.40	[illegible]
1944	1.00	1.214	1.10	.65	1.15	1.40	[illegible]

Carpenters

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913......	$0.50	$0.625	$0.65	$0.525	$0.625	$0.625	$0.56
1914......	.55	.625	.65	.45	.625	.625	.56
1915......	.55	.625	.65	.45	.625	.625	.56
1916......	.57	.625	.70	.45	.625	.625	.56
1917......	.60	.69	.70	.45	.65	.68	.65
1918......	.65	.69	.70	.55	.70	.75	.825
1919......	.75	.75	.80	.65	.825	.875	.93
1920......	1.00	1.125	1.25	.75	1.00	1.06	1.00
1921......	1.00	1.125	1.25	.75	1.25	1.125	.875
1922......	1.00	1.125	1.10	.75	1.10	1.04	.875
1923......	1.05	1.125	1.25	.75	1.25	1.04	1.00
1924......	1.05	1.3125	1.17	.76	1.525	1.00	1.00
1925......	1.0875	1.3125	1.3475	.6025	1.50	1.00	1.0825
1926......	1.20	1.45	1.39	.6575	1.50	1.00	1.125
1927......	1.25	1.50	1.30	.95	1.50	1.125	1.125
1928......	1.279	1.50	1.50	1.00	1.50	1.125	1.125
1929......	1.38	1.55	1.47	1.00	1.50	1.125	1.125
1930......	1.375	1.65	1.625	1.00	1.50	1.125	1.125
1931......	1.175	1.45	1.625	.60	1.50	1.125	.875
1932......	1.04	1.33	1.40	.60	1.275	.96	.695
1933......	1.065	1.375	1.3125	.60	1.25	.90	.73
1934......	.9375	1.40	1.3125	1.00	1.25	1.05	.83
1935......	.9275	1.40	1.3156	1.00	1.25	1.10	1.00
1936......	.937	1.40	1.50	.88	1.25	1.12	1.00
1937......	1.14	1.60	1.57	1.06	1.35	1.31	1.23
1938......	1.343	1.75	1.625	1.125	1.25	1.25	1.25
1939......	1.375	1.75	1.625	1.125	1.25	1.25	1.25
1940......	1.375	1.81	1.625	1.125	1.333	1.25	1.25
1941......	1.24	1.85	1.625	1.099	1.333	1.291	1.325
1942......	1.417	1.85	1.656	1.167	1.50	1.385	1.415
1943......	1.50	1.85	1.70	1.219	1.50	1.479	1.464
1944......	1.50	1.85	1.70	1.25	1.50	1.50	1.544

Plasterers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913	$0.65	$0.69	$0.75	....	$0.75	$0.875	$0.75
1914	.65	.69	.75	....	.75	.875	.75
1915	.65	.69	.75	....	.75	.875	.75
1916	.70	.75	.75	....	.75	.875	.75
1917	.70	.75	.75	....	.75	.875	.875
1918	.70	.75	.81	....	.875	1.00	1.00
1919	.80	.90	.875	....	1.00	1.125	1.125
1920	1.00	1.25	1.25	....	1.25	1.25	1.25
1921	1.25	1.25	1.25	....	1.375	1.375	1.25
1922	1.125	1.25	1.10	....	1.375	1.275	1.125
1923	1.125	1.25	1.50	....	1.50	1.275	1.25
1924	1.25	1.50	1.50	....	1.75	1.275	1.375
1925	1.25	1.50	1.50	....	1.75	1.50	1.375
1926	1.50	1.75	1.50	....	1.75	1.50	1.375
1927	1.50	1.75	1.625	....	1.75	1.50	1.375
1928	1.50	1.75	1.625	....	1.75	1.50	1.50
1929	1.50	1.75	1.625	....	1.75	1.375	1.50
1930	1.625	1.925	1.70	....	1.75	1.375	1.50
1931	1.50	1.7125	1.70	$1.00	1.75	1.375	1.1875
1932	1.625	1.50	1.375	1.25	1.50	1.10	1.20
1933	1.375	1.50	1.375	....	1.50	1.10	1.20
1934	1.231	1.50	1.50	1.00	1.50	1.38	1.15
1935	1.375	1.50	1.50	1.00	1.50	1.25	1.375
1936	1.375	1.50	1.50	1.00	1.50	1.35	1.25
1937	1.625	1.80	1.62	1.00	1.51	1.51	1.54
1938	1.625	2.00	1.70	1.00	1.58	1.65	1.60
1939	1.625	2.00	1.70	1.00	1.58	1.60	1.60
1940	1.625	2.00	1.70	1.00	1.722	1.60	1.60
1941	1.625	2.00	1.70	1.271	1.75	1.639	1.6375
1942	1.65	2.00	1.825	1.50	1.75	1.681	1.715
1943	1.667	2.00	1.825	1.50	1.75	1.75	1.764
1944	1.667	2.00	1.825	1.50	1.75	1.75	1.844

Structural Ironworkers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913......	$0.625	$0.625	$0.68	$0.625	$0.65	$0.75	$0.625
1914......	.625	.625	.68	.625	.65	.75	.625
1915......	.625	.625	.68	.625	.65	.75	.625
1916......	.625	.66	.68	.625	.675	.75	.625
1917......	.68	.68	.69	.625	.70	.75	.75
1918......	.80	.80	.70	.75	.80	.875	.875
1919......	.80	.875	.875	.80	.925	1.00	1.00
1920......	1.00	1.125	1.25	1.00	1.25	1.125	1.125
1921......	1.00	1.125	1.25	....	1.25	1.25	1.125
1922......	1.00	1.125	1.05	....	1.06	1.125	1.00
1923......	1.05	1.125	1.05	1.05	1.25	1.125	1.125
1924......	1.16	1.29	1.25	1.00	1.45	1.125	1.125
1925......	1.1375	1.4675	1.36	1.135	1.50	1.125	1.125
1926......	1.23	1.60	1.405	1.25	1.50	1.125	1.125
1927......	1.25	1.75	1.50	1.55	1.50	1.375	1.155
1928......	1.3125	1.75	1.50	1.75	1.50	1.375	1.215
1929......	1.375	1.81	1.57	1.63	1.57	1.375	1.25
1930......	1.375	1.925	1.625	1.25	1.75	1.375	1.25
1931......	1.375	1.925	1.625	.75	1.75	1.375	1.1875
1932......	1.205	1.675	1.375	.75	1.50	1.13	1.18
1933......	1.14	1.65	1.35	.75	1.47	1.20	1.10
1934......	1.20	1.62	1.35	1.00	1.47	1.375	1.13
1935......	1.20	1.65	1.35	1.125	1.47	1.375	1.23
1936......	1.20	1.58	1.50	1.10	1.47	1.375	1.25
1937......	1.375	1.79	1.58	1.25	1.73	1.44	1.39
1938......	1.479	1.925	1.70	1.25	1.75	1.50	1.50
1939......	1.60	1.925	1.70	1.25	1.75	1.50	1.50
1940......	1.5625	1.9625	1.70	1.302	1.75	1.60	1.50
1941......	1.50	2.00	1.70	1.469	1.75	1.60	1.5375
1942......	1.588	2.00	1.725	1.50	1.75	1.625	1.615
1943......	1.65	2.00	1.76	1.50	1.75	1.75	1.664
1944......	1.65	2.00	1.76	1.50	1.75	1.75	1.729

Common Laborers

	Boston	New York	Chicago	Birmingham	St. Louis	San Francisco	Seattle
1913	$0.35	$0.225	$0.40	....	$0.25	$0.27	$0.375
1914	.35	.225	.40	....	.25	.31	.375
1915	.35	.25	.40	....	.25	.31	.375
1916	.35	.25	.425	....	.25	.31	.375
1917	.375	.30	.45	....	.30	.375	.4375
1918	.40	.405	.50	....	.365	.43	.56
1919	.40	.405	.575	....	.425	.625	.6875
1920	.6875	.75	1.00	....	.6075	.75	.75
1921	.6875	.60	1.00	....	.6075	.81	.75
1922	.6875	.60	.725	....	.5575	.625	.625
1923	.6875	.615	.725	....	.6075	.625	.625
1924	.6625	.6875	.8175	$0.335	.70	.525	.625
1925	.6025	.6525	.8175	.31	.6525	.525	.5625
1926	.615	.815	.86	.30	.6525	.525	.5675
1927	.595	.90625	.8875	.325	.5875	.55	.64
1928	.6025	.90625	.90	.325	.60	.55	.678
1929	.625	.985	.92	.29	.61	.57	.70
1930	.625	1.03125	.975	.275	.6375	.6875	.70
1931	.60	.65625	.7375	.20	.6125	.59375	.60
1932	.575	.645	.665	.225	.56	.56	.487
1933	.548	.725	.784	.248	.6223	.64	.48
1934	.55	.8475	.825	.30	.7875	.64	.53
1935	.575	.68	.825	.30	.7875	.625	.60
1936	.581	.65	.95	.35	.7875	.651	.60
1937	.725	.91	.99	.35	.86	.75	.87
1938	.735	.912	1.025	.35	.663	.65	1.00
1939	.725	.912	1.025	.35	.663	.65	.908
1940	.725	.912	1.025	.35	.804	.745	.90
1941	.7875	.934	1.025	.4167	.875	.842	.975
1942	.879	.991	1.056	.6375	.8875	.8875	1.058
1943	.90	.991	1.10	.65	.95	.95	1.082
1944	.95	1.0213	1.10	.65	.9625	.9875	1.118

TILL THE JAPS SAY "UNCLE"

AMERICA bounced back hard in this war against the Japs, and the boys who led the rebound were *United States Marines.*

Ever since Guadalcanal the Marines have proved that boys from Kokomo, the Ozarks and the Bronx—when steeped in Marine Tradition, skilled with Marine training—are doggone good fighters. On beachhead after beachhead—then in jungle after jungle—they were far outnumbered by the Japs. But not outfought!

On they go, those Marines, on land and sea and in the air... outsmarting, outshooting, outkilling the enemy—till the Japs say "Uncle."

They have good equipment, sure. Most of the thousands of trucks they use, for example, are Internationals. And most of the thousands of bulldozing tractors they use are Internationals, too. Trucks and tractors—vital weapons in this grim, modern war!

But proud as we are that Harvester has been able to make equipment rugged enough to fight with the Marines, we know that the real fighting machine in this march to Tokyo is the Marine himself. What a machine! All speeds forward... none reverse. Tough... rugged... smart. A superlative fighter. A superb citizen.

We proudly salute those boys from Kokomo, the Ozarks and the Bronx, who are *fighting* up to their glorious motto—Semper Fidelis.

INTERNATIONAL HARVESTER COMPANY
180 N. Michigan Ave. Chicago 1, Ill.

WHERE THE MARINES FOUGHT

From Guadalcanal the Marines started marching in giant strides toward Tokyo—sweeping clean the stepping stones to Victory.

The Russell Islands, Segi Point, Viru Harbor, Rendova, Vangunu, Rice Anchorage, Enogai Point, Munda, Vella Lavella, Choiseul, Empress Augusta Bay.

On to Tarawa, the island that the Japs said couldn't be taken.

Cape Gloucester. Then Majuro, first pre-war Jap territory to fall to U. S. fighters. Roi, Namur, and other islands in the Kwajalein atoll.

Eniwetok atoll. The Marianas—Saipan, Guam, Tinian. Peleliu, in the Palau Islands. And Iwo.

Closer... closer to Tokyo.

INTERNATIONAL HARVESTER

Power for Victory... Power for Peace

Depreciation Schedule—U. S. Bureau of Internal Revenue

In January 1942 the U. S. Bureau of Internal Revenue revised its 1931 schedule of probable useful life and depreciation rates. Items of direct interest to civil engineers and contractors are shown in revised Schedule "F", and include those quoted in the following list. The schedule reveals the probable useful life in years. Annual depreciation rates are not given, inasmuch as they are considered to be on a straight-line basis. For example, on an item having a probable useful life of ten years, the annual depreciation rate is 10 percent; for an item having a probable useful life of 25 years, the annual depreciation rate is 4 percent, etc.

BUILDINGS	***BUILDING ONLY***	***BUILDING & BLDG. EQUIPMENT***		
	Est. Total Life, Years	**Composite rate (percent) Type of construction**		
		Good	**Average**	**Cheap**
Apartments	50	2½	2⅓	3
Banks	67	2	2	2½
Dwellings	60	2	2½	3
Factories	50	2¼	2½	3
Farm buildings	60	2	2	2½
Garages	60	2	2⅓	3
Grain elevators	75	1½	2	2½
Hotels	50	2½	2⅓	3
Loft buildings	67	2	2	3
Machine shops	60	2	2½	3
Office buildings	67	2	2⅓	3
Stores	67	2	2	2½
Theaters	50	2½	3	3½
Warehouses	75	1⅓	2	2⅓

BUILDING EQUIPMENT

	Years
Air conditioning:	
Air conditioning systems—	
Large—over 30 tons	20
Medium—5 to 15 tons	15
Small—under 5 tons	10
Air washer. (See Dehumidifier.)	
Compressors—	
Refrigerating	20
Air for pneumatic controls	20
Condensers—	
Shell and tube	20
Double pipe	20
Evaporation	15
Coolers, water—tank and coil or shell and tube	20
Dehumidifier	10
Drums, purge or surge	20
Ducts and other sheet metal work.*	
Fans	15
Filters, air, oil, self-cleaning	20
Dry cleanable	10
Gauges	15
Grilles and registers—	
Anemostats	20
Grilles and registers—	
Wall type	20
Ceiling	20
Window units	15
Plaques	20
Santrols.*	
Heaters—	
Boiler, oil burner and tank	20
Booster heaters	20
Electric heaters	15
Finned tube heaters, steam water cleanable tube	20
Preheaters and reheaters	20
Water heaters, open or closed type	20
Insulation—	
Cork, cold pipes and tanks	20
Magnesia, hot pipes	15
Wool felt	20
Asbestos	15
Louvres and screens, fresh air—	
Copper	25
Steel	15
Manometers	15
Motors—	
Synchronous and exciter set	20
Induction, indoor	20
Induction, weatherproof for outdoor	20
Piping, refrigerant and other	20
Pumps—	
Chilled water	20
Condenser water	20
Condensate	20
Dehumidifiers	22
Evaporative condenser	15
Sump	25
Well	25
Receivers, refrigerant	25
Regulators, suction or static pressure	5
Silicia gel beds	15
Spray pond	15
Switchboard, electric panel	20
Thermometers, room type or recording	15
Tower, cooling	15
Valves—	
Relief	20
Automatic expansion and by-pass	5
Solenoid	15
Water regulating	20
Ammeters	15
Clocks	15
Clocks, watchman	15
Compressors, air and vacuum	20
Electric clock systems:	
Clocks, time	20
Conduits, fittings and wiring. (See lighting systems)	
Motors and generators	20
Switch equipment—	
Boxes.*	
Switch parts	20
Elevators:	
Freight	25
Passenger	20
Fire equipment:	
Fire alarm systems	25
Movable equipment	20
Sprinkler system.*	
Guards, machine	25
Heaters, electric	10
Heaters, gas	15
Heating systems:	
Boilers and furnaces	20
Burner equipment—	
Gas	16
Oil	10
Radiators	25
Lighting systems:	
Conduits and fittings.*	
Wiring	20
Fixtures	15
Miscellaneous facilities:	
Awnings	5
Doors, louvre, ventilating	15
Incinerators	14
Safes and vaults.*	
Screens, window	10
Shades	5
Venetian blinds	8
Plumbing:	
Faucets and flushing valves	15
Bath tubs, lavatories, toilet bowls, etc	25
Pipes—	
Brass or copper.*	
Iron, cold-water	25
Iron, hot-water or steam	20
Sewer, cast-iron or vitrified.*	
Plumbing: (cont'd)	
Valves—	
Brass body, water or steam.*	
Iron body, water or steam	20
Pumps:	
Suction, pressure and sump	13
Roofs:	
Asbestos	25
Asphalt and tar (prepared)	15
Galvanized iron—	
Light or cold dipped	15
Heavy or hot dipped	20
Tar and gravel (5-ply)	20
Tarred felt	10
Copper, slate, tile, tin.*	
Starters, electric	20
Switchboards, electric	25
Tanks and vats, water:	
Metal	25
Wood	15
Telephone equipment:	
Conduits and fitting.*	
Wiring and fixtures	20
Tools, small, miscellaneous	5
Transformers	25
Trucks, conveyance (within building)	10
Trucks, lift	15
Voltmeters	15
Welfare equipment:	
Athletic	10
Cafeteria	10
Hospital and first aid	10
Police and fire	10
Wells and well pumps	25

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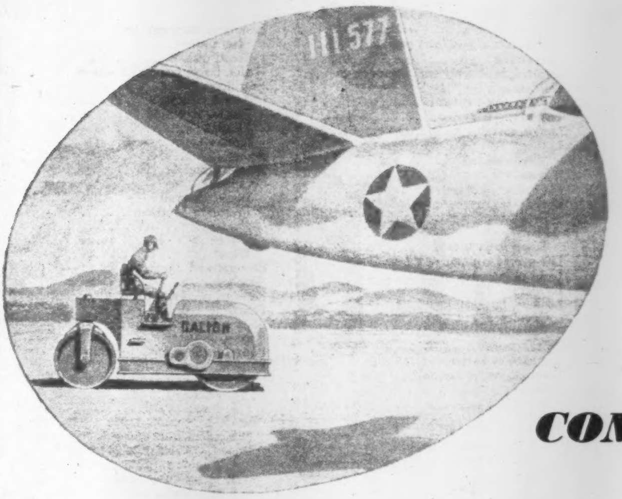
*Life of building.

CONSTRUCTION EQUIPMENT

	Years
Automobiles:	
Light	2
Medium	3
Heavy	5
Backfillers, power:	
Light	3
Medium	5
Heavy	6
Tractor	5
Barges:	
Steel	30
Wood	25
Batcher plants:	
All steel, demountable	10
Steel frame, wood bin	10
Stationery	14
Wood frame and wood bin	7
Batch, measuring devices	4
Benders, bar	5
Bending blocks	10
Bending machines:	
Angle	15
Pipe	10
Rail	10
Bins:	
Steel, concrete	6
Steel	12
Wood	8
Bin frames, steel	6
Blacksmith shop outfits, portable	4
Blocks, pulley, differential	6
Blowers, mechanical	10
Boats:	
House	20
Motor	8
Boilers:	
Upright	7
Locomotive	15
Stationary	20
Borers (wood), portable	3
Boring apparatus, test	10
Boxes, mortar and batch	3
Brakes:	
Bending	10
Cornice (sheet metal)	22
Breakers, pavement, pneumatic	3
Buckets:	
Cableway	6
Clamshell	6
Concrete	5
Elevator	5
Orange peel	6
Bail, pivot turnover	5
Scraper or drag line	6
Buggies:	
Concrete	3
Timber	3
Building, job office or storage. (Life of job)	
Bulldozers:	
Gradebuilders	8
Tractor	4
Bunkers, stone portable, with screens	6
Burner equipment, gas and oil	12
Cables, wire	4
Cableways, cable only	3
Cableway carriage	5
Camping equipment	
Capstans, electric	
Cars:	
Ballast spreader	
Batch box, steel	
Boarding and tool	
Concrete	
Derrick, bridge	
Dump, steel	
Dump, wood	
Flat, steel	
Flat, wood	12
Hand	
Hopper	
Scale	
Skip hoist	
Tank	
Carts, concrete	
Carts, tool (steel)	
Cement gun machines	
Chains:	
Hawsers and lines	
Power, transmission	
Channelers, rock	
Chipping and calking tools, pneumatic	
Chutes, concrete, gravity	
Clamps, column form	
Cleaning machine for exterior of building, steam or sand	15
Compressors:	
Belt driven	10
Electric, portable	8
Gasoline, portable	6
Motor-truck unit	5
Steam portable	6
Concrete machines, pneumatic	5
Concrete mixers:	
Electric	5
Gasoline, 3½s, 5s, 7s	3
Gasoline, 10s, 14s	4
Gasoline, 21s, 28s	6
Paving, gas	8
Paving, steam	8
Steam	8
Truck mounted	5
Controllers, motor	12
Conveyors:	
Belt, elevating—	
Portable	3
Stationary	6
Bucket	6
Cable—	
Drag	6
Monorail	15
Chain, portable	4
Portable	5
Scraper	6
Cranes:	
Bridge and cantilever	20
Crawler—	
Electric—	
2½, 5 tons	5
10, 15 tons	7
20 tons and over	9
Gas—	
2½, 5 tons	5
10, 15 tons	9
20 tons and over	12
Locomotive gas	7
Steam—	
2½, 5 tons	6
10, 15 tons	10
20 tons and over	12
Locomotive	10
Dock or wharf, traveling	20
Dragline	10
Universal (gas, 2½ to 5 ton), mounted on 10-ton truck	6
Craneways:	
Steel	15
Wood	10
Crushers, rock:	
Portable	8
Stationary	10
Cutters:	
Bar, power	5
Corrugated iron, hand	10
Cutting and welding outfits, portable	4
Davits	15
Derricks:	
Boat	10
Circle swing, hand	8
Crab—	
Hand	16
Power	10
Guy—	
Steel	12
Wood	8
Stiffleg—	
Steel	12
Wood	8
Diggers, clay, pneumatic	3
Drag lines:	
Electric—	
½, ¾ cubic yard	6
1, 1¼, and 1½ cubic yards	8
2 cubic yards and over	10

PRECISE



COMPACTION

IN ROAD AND AIRPORT CONSTRUCTION

GALION rollers . . . tandem, 3-wheel, portable and sheepsfoot . . . have been giving a good account of themselves during this war. Seeing service on practically all the fighting fronts, these modern units will bring to the highways and airports of tomorrow the same stamina and trustworthiness so apparent in our drive for Victory.

The Galion Iron Works & Mfg. Co.

Main Office and Works: Galion, Ohio

Galion motor graders have been in the thick of things also . . every day we hear construction stories of their part in the war effort. The big Galion No. 101 is shown at the right . . it is built to do the heaviest kind of blading, ditching, leveling, bank sloping and road widening work. You'll like the way it performs on the tough jobs.

Drag Lines: (cont'd)	Years
Gasoline—	
½, ¾ cubic yard	5
1, 1¼ and 1½ cubic yard	9
2 cubic yards and over	12
Steam—	
½, ¾ cubic yard	6
1, 1¼ and 1½ cubic yards	10
2 cubic yards and over	12
Dredges:	
Clamshell	16
Dipper	8
Hydraulic	20
Pipe	10
Drill boats	12
Drill points, well	5
Drills:	
Airdrifter	3
Electric or pneumatic, hand, for wood or metal	5
Hand, electric	3
Rock, electric	3
Jackhammer	3
Steam	5
Traction, well	7
Tripod	7
Tunnel carriage	5
Well	10
Drums for oil (steel)	10
Elevators:	
Bucket, stationary	6
Cage (steel tower)	5
Engines:	
Blowing	12
Fire	7
Gas	10
Marine	20
Oil	20
Plumbing	14
Steam	11
Excavators:	
Cableway, complete	4
Trench, gasoline—	
7-foot depth	6
12-foot depth	6
18-foot depth	8
Trench, steam—	
7-foot depth	8
12-foot depth	8
18-foot depth	10
Trench, vertical boom	5
Wheel or ladder type	5
Extinguishers, fire	3
Fans, exhaust	15
Finishing machines	4
Floats, bridge (steel)	5
Forges, gas or oil burning	10
Forms:	
Concrete (metal pans)	5
Concrete, supports, adjustable	4
Steel, for—	
Pavements	4
Pipes	3
Roads	4
Tunnels and conduits	4
Walls	5
Furnaces, metal melting:	
Coal fired	10
Electric	12
Gas or oil	7
Generator sets:	
Steam engine	12
Turbine, headlight or floodlight	4
Gin poles (steel)	10
Gradebuilders (bulldozers)	8
Graders:	
Blade, road—	
7, 8 foot blade	4
9, 10 foot blade	5
over 10-foot blade	8
Elevating	8
Form, subgrade planers	6
Rooters, wheel	5
Grinders:	
Metal surface	15
Saw filers and setters	14
Surface, concrete	4
Hammers:	
Electric	3
Pneumatic riveting	3
Harness	4
Heaters, asphalt, tar, and pitch kettles	4
Helmets, gas and diving suits and equipment	10
Hoists:	
Air, electric, or steam	8
Chain	6
Electric monorail or post	5
Gas	6
Hand power	8
Slew—	
Electric	8
Steam	12
Holders on pneumatic	4
Horses	5
Hose:	
Fire, linen or rubber lined cotton	5
Metal, flexible	10
Oil	5
Reel or cart	10
Rubber, air, steam or water	10
Inundators, batch	4
Inland craft:	
Graders, hydraulic	7
Quarter boats	10
Jacks:	
Hydraulic	8
Rail	25
Rachet	8

Jacks: (cont'd)	Years
Screw	5
Steamboat, push and pull	3
Jibs, steam	17
Jointers, bench, electric, steam or gas	5
Ladders:—	
Rope, wood rungs	2
Steel	3
Ladles, metal	7
Lathes:	
Metalworking	15
Woodworking	17
Launches, gasoline	10
Levee construction equipment:	
Drag lines	8
Shovels	8
Tower excavators	12
Life-saving equipment	10
Light plant	4
Lighters	22
Loaders, bucket:	
Crawler	5
Portable	5
Stationary	6
Locomotive battery	4
Locomotives, industrial:	
Diesel	10
Electric	16
Gas—	
Up to 10 tons	8
10 to 20 tons	15
Over 20 tons	20
Steam—	
Up to 10 tons	8
10 to 20 tons	18
Over 20 tons	20
Locomotives, standard gage	30
Magnets, lifting	15
Milling machines	15
Mixers; portable mortar	3
Less than ½ cubic yard	6
Over ½ cubic yard	8
Caterpillar	8
Motors:	
AC and DC—	
Large	12
Medium	10
Small	8
Hydraulic	5
Pneumatic	5
Mowers, right of way	5
Mules	5
Pile drivers:	
Barge	8
Railroad outfits	10
Steam, on skids	10
Track	12
Pile hammers, steam or air:	
Heavy	10
Light	4
Medium	5
Pipe:	
Black or galvanized	4
Wood	5
Wood and steel combination	6
Pipe lines and fittings, for floating dredges	10
Pit and quarry plants	6
Planers:	
Metalworking	15
Woodworking	20
Plows:	
Furrow	3
Rooter	6
Pontoons	20
Presses, drill	12
Pumping units:	
Electric—	
Centrifugal	6
Diaphragm	6
Piston	6
Gas—	
Centrifugal	6
Diaphragm	6
Highway contractor's pump	4
Piston	5
Steam, centrifugal	10
Pumps:	
Air lift	10
Centrifugal	6
Humdinger	6
Impulse	6
Hydraulic	15
Oil	10
Steam piston unit	6
Testing for pipe lines	15
Punches, hydraulic	20
Punches for steel, power	15
Racks, storage, for pipe and steel:	
Steel	20
Wood	15
Rails, steel	10
Razing equipment, for buildings	8
Reamers:	
Electric	3
Pneumatic	3
Riveters, pneumatic	5
Rollers:	
Concrete finishing (steel)	10
Road, gas	10
Road, steam	10
Rolls, ridge	5
Rowboats	6
Sand-blast outfits	10
Sawmills, portable	10
Saws:	
Band, cut-off and rip, power	10
Hand, Electric and pneumatic	3

	Years
Saws and woodworkers.	
Steel frames	10
Wood frames	5
Scales, large, track and wagon	20
Scarifiers:	
Attachments	4
Blocks, steerable	5
Drag, all steel	4
Grader type	4
Scows	25
Scows, dump	25
Scrapers:	
Blade, carryall	6
Fresno or Morman	2
Rotary	4
Slip	2
Wheel	5
Screens and bunkers, for gravel pits only	5
Screens, revolving	6
Sharpeners, drill	8
Shears, for steel, hand	10
Shores, adjustable	4
Shovel attachments, for cranes	6
Shovels:	
Electric or gasoline, crawler or wheel—	
½, ¾ cubic yard	5
1, 1¼, 1½ cubic yards	6
2 cubic yards and over	8
Steam, crawler or wheel—	
½, ¾ cubic yard	7
1, 1¼, 1½ cubic yard	8
2 cubic yards and over	10
Railroad, steam	10
Tunnel	4
Spouting plants, complete, concrete	4
Spraying equipment, paint	12
Spreaders, stone:	
Hopper wagon	5
Steel box	5
Steamers, paddle wheel	30
Switches:	
Portable	4
Stationary	5
Tampers, backfill, pneumatic	3
Tamping machines	10
Tanks:	
Gasoline, storage	6
Relay	6
Water or air, storage (steel)	10
Water storage (wood)	14
Tarpaulins and tents	3
Threading and cutting machines, pipe	10
Ties:	
Steel	12
Wood	6
Tongs, chain	4
Towers:	
Cableway—	
Steel	6
Wood	3
Steel boom with counterweights	5
Tracks, industrial, portable	6
Tractors:	
Electric—	
3-ton	3
5-ton	5
10-ton	6
20-ton	8
Gas or steam—	
3-ton	4
5-ton	6
10-ton	8
20-ton	10
Trailers:	
Dump—	
Steel	10
Wood	10
Platform, wood	4
Drop platform, heavy duty	5
Transformers, car	10
Trenching machines. (See Excavators.)	
Trucks, auto:	
General purpose or dump—	
½-¾ cubic yard	3
1-1½ cubic yards	5
2 cubic yards and over	8
Tugs, screw-propelled, steam or gas	25
Turntables, industrial railway	4
Vises	5
Wagons:	
Dump—	
Steel	6
Wood	6
Farm—	
Heavy	10
Light	10
Road oilers, tank, steel	10
Tank or sprinkler—	
Steel	10
Wood	8
Washers, gravel	3
Welding outfits, acetylene or electric	10
Wheelbarrows	2
Winches, electric and pneumatic	10
Wire and cables:	
Electric	6
Flexible, steel armored	8

BRIDGES

Concrete and steel or masonry, large	100
Concrete and steel or masonry, small	75
Steel, heavy	50
Steel, light	40

WATER SUPPLY

	Years
Impounding dams	
Springs and wells	
Infiltration galleries and tunnels	
Collecting conduits and reservoirs	
Mains, cast iron:	
4-inch and less	
6-inch	
8- to 10-inch	
12-inch and over	
Settling basins	
Coagulating basins	
Filters	
Steam engines	
Internal combustion engines (Diesel type)	
Pumps	
Stand pipes	
Meters	
Hydrants	
General office equipment	
General shop equipment	
General store equipment	
Laboratory equipment	

ELECTRIC UTILITIES

Steam Production

	Years
Structures and improvements	50
Boiler plant equipment	28
Engines and engine driven generators	30
Turbo-generator units	30
Accessory electric equipment	28
Miscellaneous power plant equipment	28

Hydraulic Production

Structures and improvements	75
Reservoirs, dams and waterways	150
Waterwheels, turbines and generators	35
Accessory electric equipment	35
Miscellaneous power plant equipment	35
Roads, railroads and bridges	100

Transmission Plant

Structures and improvements	45
Station equipment	28
Towers and fixtures	50
Poles and fixtures	33
Overhead conductors and devices	50
Underground conduit	75
Underground conductors and devices	40
Roads and trails	60

Distribution Plant

Structures and improvements	45
Station equipment	28
Storage battery equipment	20
Poles, towers and fixtures	35
Overhead conductors and devices	33
Underground conduit	60
Underground conductors and devices	40
Line transformers	28
Services	28
Meters	28
Installations on customers' premises	25
Street lighting and signal systems	22

ARTIFICIAL GAS

Production Plant

	Years
Structures and improvements	50
Boiler plant equipment	30
Other power equipment	40
Benches and retorts	35
Coke ovens	35
Producer gas equipment	33
Water gas generating equipment	33
Petroleum gas equipment	33
Other gas generating equipment	33
Coal, coke, and ash handling equipment	40
Gas reforming equipment	33
Purification equipment	33
Residual refining equipment	40
Other production equipment	33

Distribution Plant

Structures and improvements	45
Mains	80
Cast iron pipe—	
4 inches and less	50
6 inches	65
8 to 10 inches	75
12 inches and over	100
Steel pipe—	
4 inches and less	30
5 to 7 inches	40
8 inches and over	50
Wrought iron pipe—	
¾ inches to 1½ inches	35
2 to 2½ inches	40
3 to 6 inches	50
8 to 10 inches	75
12 inch and over	100
Pumping and regulating equipment	35
Services	40
Meters	35
Meter installations	40
House regulators	40
House regulator installations	40
Other property on customers' premises	33
Other distribution system equipment	35

Look to DEMING

(*above*) This Deming High Speed Rotary Pump does the work of three men formerly employed as oilers in a war production plant.

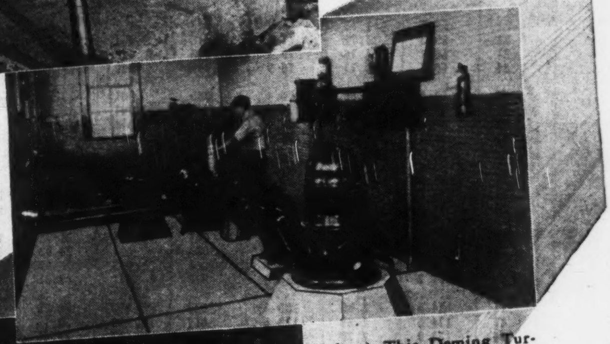
(*left*) This Deming Turbine has served continuously for three years without repairs although exposed to extremes of weather in a northern climate.

FOR DEPENDABLE PUMP PERFORMANCE

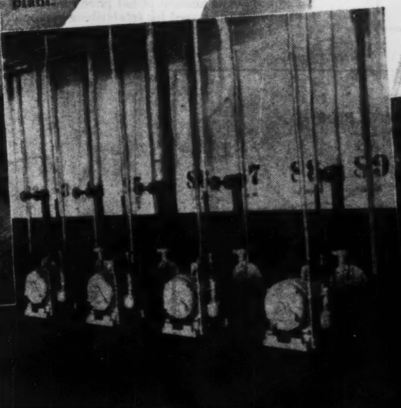
Best recommendation of any line of products serving industry is the war-time record that calls for continuous service under conditions of "wear and tear" never encountered in normal times.

Deming Pumps are proving by their actual performance records that high standards of engineering and manufacturing point up to peak efficiency and durability under "acid test" operating conditions.

If you have an immediate and essential pumping problem, Deming and the Deming Distributor in your area will make every effort to cooperate. Write THE DEMING COMPANY, SALEM, OHIO.



(*above*) This Deming Turbine pumps entire water supply for a large plant at a saving of approximately 50% compared with former municipal water rates.



(*left*) Partial view of a battery of Deming Centrifugal Pumps used for cooling tower service in a vital war plant.

(*right*) Another battery of Deming Centrifugal Pumps that have worked "around the clock" for several years without any major repairs.

(*below*) This Deming Centrifugal Pump has worked underground for several years without repairs although exposed constantly to dampness.

THE DEMING COMPANY · SALEM, OHIO, U. S. A.

Roadbuilding Costs

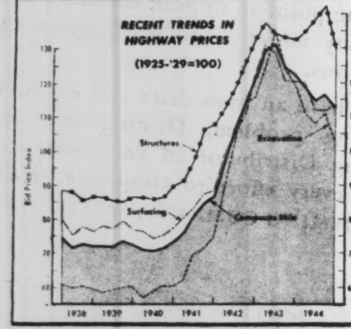
THE COST of constructing a composite standard mile of highway in 1944 declined 9 percent from the all-time high average of 1943 according to the Index of Highway Construction Costs of the Public Roads Administration. The 1944 index average, 115.6, was below the peak of last year, but exceeds all other annual values since 1923.

The PRA Index is based on average prices in the 1925-'29 period for a composite mile of road. It includes excavation, surfacing and structures. Quantities involved in these three items are considered as constant for the index, but in actual practice, of course, they vary from job to job.

Highway excavation bid price averaged 38c. per cubic yard in 1944 compared with 44c. in 1943. The 1944 value was 39c. in the first quarter, and fell to 36c. in the final quarter. The average, with the exception of 1943, topped all years since 1925.

Surfacing costs, $2.54 per square yard, dropped 9 percent below a year ago, but were higher than any other annual average on record. The year opened at $2.67 but was down to $2.51 per square yard for the fourth quarter according to the fig

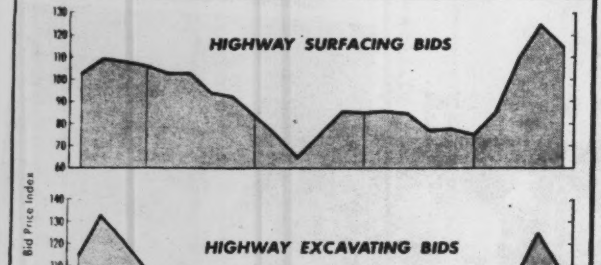
The structures index for climbed 1.6 percent above its re high of last year, but the index va after reaching the peak of 142.7 in third quarter, dropped to 130.0 in closing quarter of 1944.

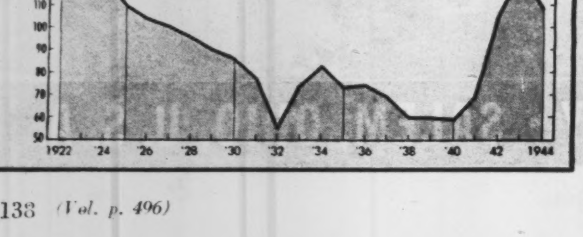


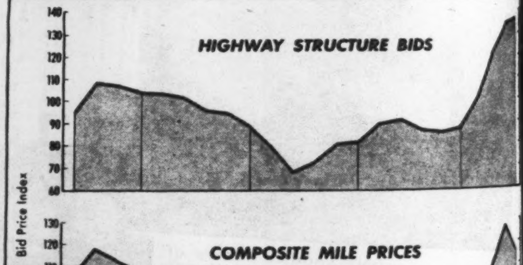
Price Trend in Highway Construction for Composite Standard

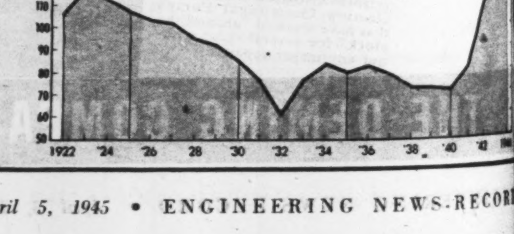
Year	Excavation [1] (17,491* cubic yards)		Surfacing [2] (3,726* square yards)		Structures			
					Reinforcing steel (16,000* pounds)	Structural steel (4,325* pounds)	Structural concrete (68* cubic yards)	Combined
	Bid price [3]	Sub-index	Bid price [3]	Sub-index	Bid price [3]	Bid price [3]	Bid price –	Sub-index
Base period, 1925 to 1929..	$0.35†	100.0	$2.22†	100.0	$0.052†	$0.067†	$22.15†	100.0
1922...........	.40	114.5	2.28	102.7	.050	.074	20.18	95.1
1923...........	.47	133.3	2.43	109.5	.057	.078	23.37	108.6
1924...........	.43	122.2	2.40	108.3	.057	.077	22.91	107.2
1925...........	.39	110.0	2.36	106.4	.056	.067	22.53	103.9
1926...........	.36	103.7	2.29	103.1	.053	.074	22.76	103.7
1927...........	.35	100.3	2.29	103.3	.051	.071	22.65	101.5
1928...........	.34	96.0	2.10	94.5	.049	.067	21.22	96.1
1929...........	.32	90.0	2.05	92.7	.048	.059	21.58	95.0
1930...........	.30	86.3	1.86	84.1	.045	.061	20.08	89.4
1931...........	.27	77.6	1.68	75.6	.040	.054	18.02	79.9
1932...........	.18	55.0	1.44	64.8	.034	.046	15.33	68.0
1933...........	.26	74.0	1.67	75.1	.038	.046	16.15	72.2
1934...........	.29	83.3	1.90	85.8	.043	.053	17.73	80.8
1935...........	.26	73.3	1.90	85.6	.044	.052	17.78	81.5
1936...........	.26	74.8	1.91	86.0	.046	.060	20.25	90.0
1937...........	.24	69.0	1.89	85.1	.048	.066	19.76	91.5
1938...........	.21	59.8	1.72	77.5	.045	.063	19.06	87.2
1939								
1st Q........	.21	58.7	1.73	78.0	.043	.058	19.46	86.4
2nd Q........	.21	59.3	1.72	77.4	.043	.059	19.03	85.4
3rd Q........	.21	60.1	1.76	79.4	.043	.060	18.95	85.1
4th Q........	.21	60.4	1.71	76.9	.045	.060	19.07	86.8
1940								
1st Q........	.20	57.0	1.69	76.4	.045	.061	18.88	86.2
2nd Q........	.21	58.7	1.65	74.6	.043	.061	19.07	85.9
3rd Q........	.21	60.4	1.67	75.3	.044	.064	18.95	86.3
4th Q........	.21	60.4	1.72	77.7	.046	.066	19.79	90.0
1941								
1st Q........	.22	62.4	1.78	80.4	.047	.066	19.99	91.3
2nd Q........	.24	69.5	1.86	83.8	.051	.075	20.88	97.6
3rd Q........	.25	71.2	1.94	87.5	.057	.080	22.56	106.4
4th Q........	.26	74.4	1.96	88.6	.060	.082	22.32	107.8
1942								
1st Q........	.31	87.5	2.21	99.7	.061	.084	23.72	112.6
2nd Q........	.36	103.1	2.34	105.3	.063	.091	24.93	118.3
3rd Q........	.40	114.0	2.46	110.8	.066	.095	26.97	125.6
4th Q........	.41	115.7	2.73	123.0	.070	.091	29.01	132.8
1943								
1st Q........	.44	124.5	2.90	130.8	.073	.093	30.02	137.6
2nd Q........	.47	134.5	2.83	128.6	.067	.092	30.17	134.3
3rd Q........	.44	123.9	2.70	120.7	.067	.097	29.48	133.1
4th Q........	.42	119.6	2.70	120.7	.059	.096	31.08	132.4
1944								
1st Q........	.39	111.1	2.67	120.4	.066	.094	30.35	134.4
2nd Q........	.38	108.3	2.48	111.8	.064	.093	32.62	138.9
3rd Q........	.39	111.0	2.48	111.8	.064	.091	34.24	142.7
4th Q........	.36	102.9	2.51	113.1	.062	.078	30.53	130.0

[1] Common excavation plus other excavation items expressed as equivalent common excavation.
[2] Portland-cement concrete plus other surfacing items expressed as equivalent portland-cement concrete.
[3] Indexes and totals were calculated with the bid prices carried to one more decimal place than that to whic are shown in this table.
Column showing amount of bid price times fixed quantity omitted in this table.
* Fixed quantities used for establishing composite mile for price trend.
† Fixed prices used for establishing composite mile index base.









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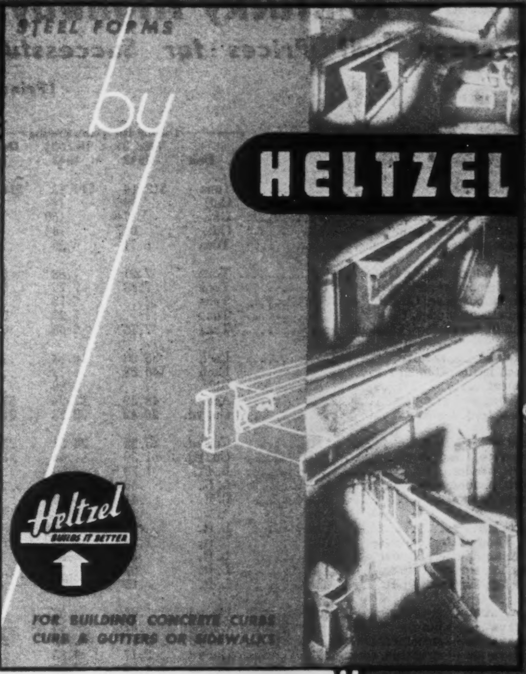

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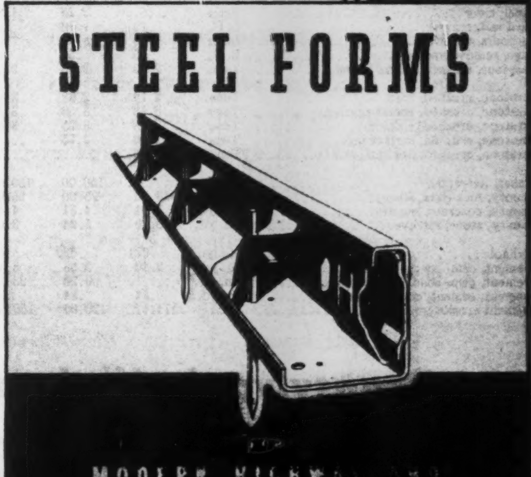

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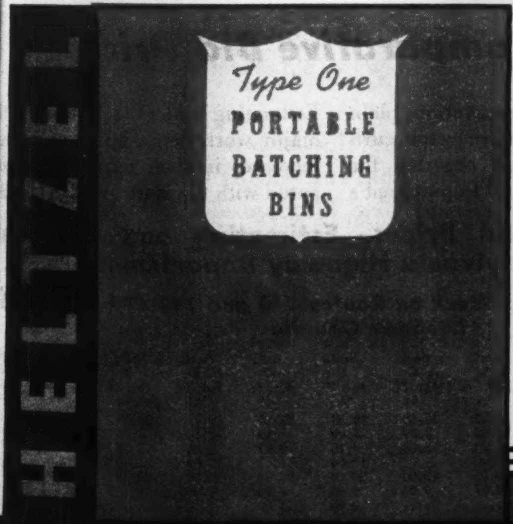

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Kentucky Highway Unit Bid Price Averages

Average Unit Prices for Successful Bids—Kentucky Department of Highw

(Principal Items Only)

		During the years ending:		
Item	Unit	Dec. 31, 1942	Dec. 31, 1943	Dec. 31, 1944
Asphalt, rock	Tons	$12.14	$13.43	$13.31
Asphalt cutback, MC-3	Gal.	.136	.114	.122
Asphalt cutback, RC-2	Gal.	.174	.150	.110
Asphalt cutback, paint coat	Gal.	.097	.153	.134
Bituminous concrete base	Tons	6.71	6.89	......
Bituminous concrete binder	Tons	7.91	7.88	6.92
Bituminous concrete surface	Tons	7.33	7.76	6.51
Bituminous base, Class F	Tons	......	6.70	......
Bituminous binder, Class F	Tons	......	7.23	7.77
Bituminous surface, Class F	Tons	7.40	6.53	6.32
Catch basins, remove	Each	35.00	16.13	......
Catch basins, standard	Each	145.58	......	......
Cement	Bbl.	......	2.86	......
Clearing and grubbing	Acre	48.59	87.94	53.34
Concrete, Class A	Cu. yd.	26.42	32.23	31.18
Concrete, Class B	Cu. yd.	23.25	25.21	25.39
Concrete, Class D	Cu. yd.	61.39	81.54	81.34
Curb, header	L. Ft.	1.50	1.50	......
Curb, header, remove	L. ft.	.56	......	......
Curb, integral	L. ft.	.44	.40	.50
Curb, lip	L. ft.	.10	.164	.10
Curb and gutter, concrete	L. ft.	1.53	2.24	1.94
Curb and gutter, remove	L. ft.	.32	.55	.85
Ditches, surface 1 sq. ft	L. ft.	.09	.10	......
Ditches, surface 2 sq. ft	L. ft.	.15	.237	......
Excavation roadway	Cu. yd.	.62	.527	.63
Excavation — borrow	Cu. yd.	.52	.45	.66
Excavation — structure, unclass	Cu. yd.	2.26	2.52	2.67
Excavation — structure, common	Cu. yd.	2.17	4.85	2.55
Excavation — structure, S. R.	Cu. yd.	4.57	7.59	5.48
Excavation — trench and shoulder	Cu. yd.	.37	.58	.40
Final dressing	Station	12.66	13.87	12.06
Flumes	L. ft.	2.08	2.44	2.50
Grader work	Mile	......	50.00	587.69
Gravel, bank or creek	Tons	.80	2.53	1.52
Gravel, river	Tons	......	2.25	1.80
Guard rail, remove	L. ft.	.29	1.00	.37
Headwalls, remove	Each	8.22	8.70	7.01
Hedge, remove and reset	L. ft.	.55	.50	.57
Limestone, crushed, traffic bound	Tons	2.39	2.55	2.78
Limestone, crushed, base	Tons	2.19	2.98	3.65
Limestone, crushed, coarse aggregate	Tons	3.98	3.50	3.56
Limestone, crushed, chips	Tons	2.18	3.75	3.50
Limestone, crushed, surface mix	Tons	2.40	3.75	......
Limestone, crushed, fine surf. mix	Tons	2.75	......	......
Lumber, untreated	Mfbm.	......	150.00	150.00
Masonry, first class, stone	Cu. yd.	13.00	25.00	25.00
Masonry, concrete, remove	Cu. yd.	3.51	4.31	4.46
Masonry, stone, remove	Cu. yd.	3.20	5.24	3.04
Overhaul	Sta. yd.	.021	.022	.023
Pavement, cem. concrete (plain)	Sq. yd.	2.40	2.58	3.10
Pavement, cem. conc. (for patching)	Cu. yd.	......	30.20	23.28
Pavement, cement, concrete, remove	Sq. yd.	.54	.84	.79
Pavement crossovers	Each	171.67	126.00	150.00

		During the years ending:		
Item	Unit	Dec. 31, 1942	Dec. 31, 1943	De
Paving, stone	Sq. yd.	......	$3.00	......
Piling, concrete, 14-in	L. ft.	......	3.96	......
Piling, concrete, 18-in	L. ft.	......	7.00	......
Piling, concrete, 20-in	L. ft.	......	7.50	......
Piling, treated timber	L. ft.	1.75	2.40	......
Piling, untreated timber	L. ft.	......	......	3.2
Pipe, entrance, corr. metal, 15-in	L. ft.	......	2.49	......
Pipe entrance, corr. metal, 24-in	L. ft.	......	2.91	2.9
Pipe, culvert, concrete, 12-in. (plain)	L. ft.	2.75	2.00	1.3
Pipe, culvert, concrete, 15-in. (plain)	L. ft.	2.19	1.88	2.0
Pipe, culvert, concrete, 18-in. (plain)	L. ft.	2.46	2.39	
Pipe, culvert, concrete, 24-in. (plain)	L. ft.	3.37	3.28	......
Pipe, culvert, concrete, 18-in. (reinf.)	L. ft.	......	......	3.0
Pipe, culvert, concrete, 24-in. (reinf.)	L. ft.	......	......	3.9
Pipe, culvert, concrete, 30-in. (reinf.)	L. ft.	4.38	4.74	5.1
Pipe, culvert, concrete, 36-in. (reinf.)	L. ft.	5.88	6.03	6.3
Pipe, culvert, concrete, 42-in. (reinf.)	L. ft.	7.62	7.00	......
Pipe, culvert, concrete, 48-in. (reinf.)	L. ft.	8.25	......	10.9
Pipe, culvert, concrete, 54-in. (reinf.)	L. ft.	14.67	......	......
Pipe, sewer, concrete, 8-in	L. ft.	1.44	......	.8
Pipe, sewer, concrete, 15-in	L. ft.	1.50	......	......
Pipe, extra strength, 24-in	L. ft.	3.84	......	......
Pipe, concrete, 54-in., extra strength	L. ft.	17.50	......	......
Pipe, concrete, entrance, 12-in. (plain)	L. ft.	1.10	1.60	......
Pipe, concrete, entrance, 15-in. (plain)	L. ft.	1.74	1.88	2.9
Pipe, concrete, entrance, 18-in. (plain)	L. ft.	2.22	2.70	2.8
Pipe, concrete, entrance, 24-in. (plain)	L. ft.	3.10	3.11	3.4
Pipe, concrete, entrance, 30-in. (plain)	L. ft.	4.50	......	......
Pipe, concrete, entrance, 36-in. (reinf.)	L. ft.	6.14	6.00	......
Pipe, removing	L. ft.	.93	.96	.9
Pipe, relaying	L. ft.	.96	1.24	1.1
Project monuments	Each	16.36	18.15	19.3
Riprap	Sq. yd.	3.50	2.55	4.0
Scarifying and reshaping	Sq. yd.	.07	.09	.0
Sidewalk, concrete	Sq. yd.	2.85	2.89	2.2
Sidewalk, concrete, removing	Sq. yd.	.23	1.64	1.0
Sidewalk, brick, removing	Sq. yd.	.40	......	......
Slag, crushed, traffic bound and base	Tons	4.00	3.08	3.6
Slag, crushed, coarse aggregate	Tons	......	3.00	......
Slope protection	Sq. yd.	2.86	2.99	2.9
Stabilized base	Sq. yd.	......	.29	......
Steel, reinforcing	Lb.	.06	.06	.0
Steel, structural	Lb.	.15	.25	.0
Stone, fence, remove	L. ft.	1.45	......	2.0
Spring box	Each	75.00	241.67	......
Tar, refined, RT-3	Gal.	.176	.179	.1
Traffic stripe, permanent	L. ft.	.04	......	......
Trees and stumps, remove	Each	24.33	22.41	10.0
Timber, untreated	Mfbm.	......	150.00	178.0
Timber, treated	Mfbm.	194.03	190.98	225.0
Valley gutter, concrete	L. ft.	3.15	3.50	......
Water	100 Gal	.21	.16	.1
Wrought iron	Lb.	......	.15	......

Pennsylvania Highway Comparative Bid Prices

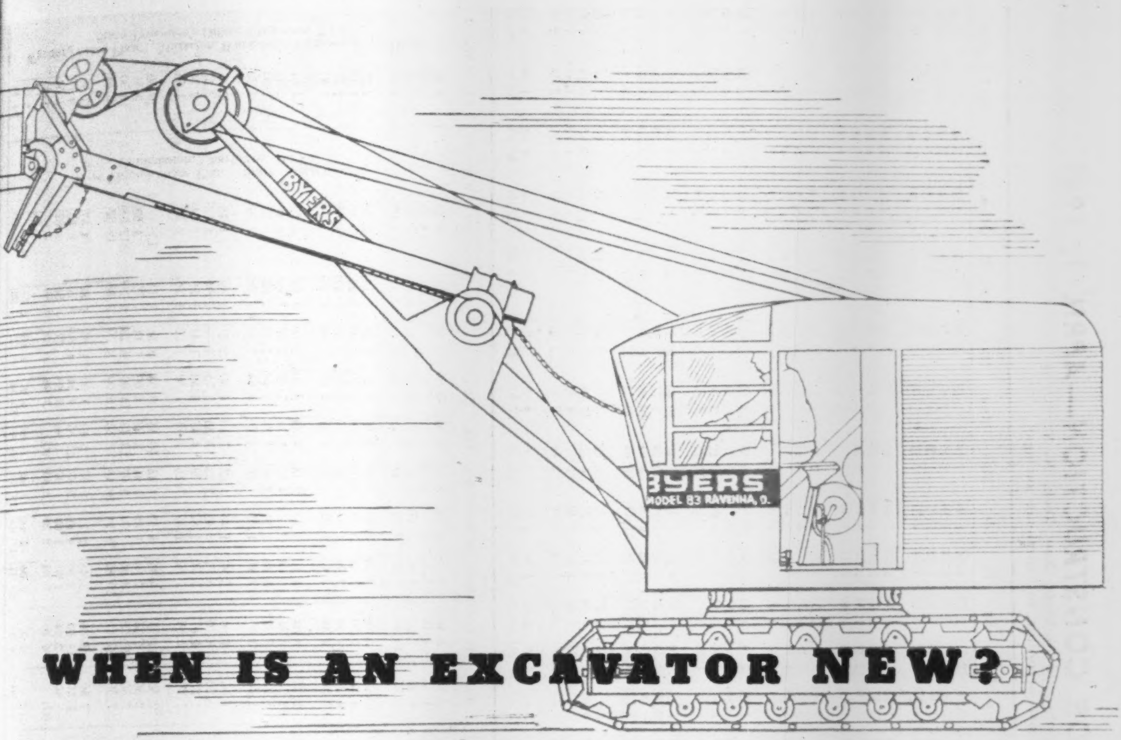
THE ACCOMPANYING tabulation shows bid prices received on major items of work for seven sections of Routes 140 and 141, Traffic Route No. 22, Dauphin and Lebanon Counties, Pa. Bids were taken by the Pennsylvania State Highway Department in the sections in April and October 1944 and the results tablulated in the columns headed Sections A to G. These individual project bids were then weighted according to the volumes involved in each item of work, and the results are shown in the column at the right.

The weighted average of bid prices for Sections A to G reveal lower unit bid costs on Class I excavation, plain steels bar, and white reflector curb (Type A), than those reported for 1941 by the Highway Department's Estimating and Cost Unit. All othe major work items, however, recorde increases in their current costs compared with the state average for 1941.

Comparative Bid Prices—Estimating and Cost Unit, Pennsylvania Highway Department

For Major Items of Work on Routes 140 and 141 (TR 22) Dauphin-Lebanon Counties, Pa.

Items	1941 Aver. Price	Sect. A Apr. 27, '44	Sect. B Apr. 27, '44	Sect. C Apr. 28, '44	Sect. D Apr. 28, '44	Sect. E Oct. 24, '44	Sect. F Oct. 24, '44	Sect. G Oct. 23, '44	Weighted Av. Bids Sections A-G
Class I Excav	$0.525	$0.75	$0.46	$0.53	$0.45	$0.49	$0.48	$0.46	$0.488
Class 2 Excav	2.216	1.25	3.00	3.00	2.50	2.75	2.50	2.50	2.693
9" R.C.C. Pavement	2.624	3.20	3.09	3.15	2.90	2.99	3.05	3.08	3.071
Class A. Conc	26.042	34.00	.....	40.00	.....	37.00	35.00	30.00	35.510
Class B. Conc	20.330	33.00	30.00	30.00	26.00	25.00	30.00	25.00	27.653
Pl. Steel Bars	0.056	0.07	0.06	0.06	0.06	0.053	0.055	0.055	0.055
Pl. Str. Steel	0.063	.....	.....	0.06	.....	0.07	......	......	0.069
Fab. Str. Steel	0.076	.....	.....	.....	.....	0.12	......	......	0.130
Wh. Refl. Curb A	1.638	1.65	.....	.....	.....	1.50	1.50	1.55	1.632
Wh. Refl. Curb B	......	1.80	2.00	1.75	1.65	1.55	1.55	1.60	1.645



WHEN IS AN EXCAVATOR NEW?

WHEN WPB Order L-192 is amended or rescinded to permit resumption of normal commercial sale of shovels and cranes, Byers will offer the construction industry a line of new and greatly improved excavators.

In capacities from ⅜ through 1 cu. yd., the Byers postwar line has been built up to provide excavator performance such as will be required in an era of high operating costs, competitive bidding and narrow margins, where profit depends principally on the use of profit-earning equipment.

The only model in Byers present wartime line which will be offered for postwar sale is the reliable ¾ yd. Byers Model 83 . . . and it is undergoing engineering improvements to help it exceed its remarkable prewar performance records.

All other models will be "new" to most private contractors and political purchasers because they will not have seen them before. But they will no longer be "new" to war contractors and government agencies who will have used them on severe wartime service. It is from this world-wide proving ground that Byers engineers are now checking performance, wear and maintenance to assure you of thoroughly tested, proved and approved new shovels and cranes you will be eager to own and use.

For full information, contact the Byers distributor near you.

THE BYERS MACHINE CO.

★ Ravenna, Ohio ★

Distributed throughout the World

BASE RATES ON COMPENSATION INSURANCE FOR CONSTRUCTION—APRIL 1, 1945

Data Compiled by Herbert L. Jamison & Co., Insurance Advisors and Auditors, New York, N. Y.
(Base rates in effect April 1, 1945—subject to increase or decrease according to experience ratings)

Classification of Work (A)	Ala.	Ariz.	Ark.	Cal.	Colo.	Conn.	Del.	D. C.	Fla.	Ga.	Idaho	Ill.	Ind.	Iowa	Kans.	Ky.	La.	Me.	Md.	Mass.	Mich.	Minn. (E)	Miss.	Mo.	Mont.	Neb.
1. Carpentry — private residences	1.70	4.22	4.40	5.06	3.57	2.22	1.75	2.42	2.90	1.78	3.78	3.13	2.56	2.69	2.71	2.73	4.36	1.89	2.19	2.63	3.78	4.50	2.86	3.46	3.50	2.96
2. Carpentry — dwellings, 3 stories or less	1.70	8.28	4.40	5.06	3.57	3.09	1.75	2.42	2.90	1.81	3.78	3.24	2.49	2.69	2.71	2.84	4.36	1.89	2.19	2.63	3.78	4.50	2.86	3.46	3.50	2.96
3. Carpentry — interior trim	.90	8.28	2.37	5.06	1.48	1.85	1.75	1.78	1.01	.92	1.85	1.29	1.11	1.17	1.43	3.88	1.92	1.27	1.25	1.67	1.88	4.50	1.99	3.46	1.69	1.53
4. Carpentry — general	2.29	8.28	8.41	5.06	3.80	5.82	1.75	4.12	2.90	3.59	6.20	5.26	4.71	3.17	5.20	3.88	5.79	4.29	4.17	7.60	3.78	4.50	11.50	3.46	5.76	4.78
5. Concrete and cement walk laying (B)	1.11	2.68	2.63	1.87	1.81	2.21	(L)	1.64	1.26	1.40	2.32	2.11	1.18	1.45	1.78	1.41	2.35	1.62	1.85	2.17	1.45	1.72	2.61	1.99	2.11	1.88
6. Concrete work — general (B)	2.65	8.50	7.07	4.50	4.23	5.97	1.75	3.65	3.37	2.14	6.15	3.80	2.34	3.17	5.20	3.42	7.76	2.98	3.25	5.48	4.68	4.80	9.71	4.97	5.21	4.78
7. Concrete work — dwellings, 3 stories or less (B)	1.54	8.50	3.98	4.50	3.33	3.97	4.75	3.29	1.50	1.08	3.00	1.83	1.63	1.70	2.24	1.44	2.92	2.78	3.54	5.10	2.16	2.52	6.83	3.09	2.74	2.09
8. Electric wiring	1.11	2.83	2.49	2.45	1.57	1.84	1.25	1.82	1.41	1.27	[illegible]	1.59	1.21	1.46	1.54	1.40	2.33	1.30	1.31	1.43	1.53	1.93	2.40	1.69	1.89	2.09
9. Excavation — earth (C)	1.87	6.82	4.55	3.19	5.38	3.89	1.50	3.51	1.86	1.37	6.41	2.84	2.26	2.70	3.72	2.53	3.29	2.62	2.88	4.53	2.90	4.31	5.34	3.57	5.94	3.47
10. Excavation — rock (D)	3.14	11.33	7.61	6.32	5.17	6.55	1.50	5.98	3.89	3.04	7.17	4.78	3.91	3.93	5.18	4.23	(L)	4.14	4.37	8.53	5.63	5.82	9.93	6.31	6.38	5.60
11. Glazing	2.53	5.52	6.10	5.39	4.15	4.94	.70	4.31	3.24	2.47	5.53	3.79	3.13	3.19	4.13	3.39	5.28	3.49	3.51	3.94	4.08	4.52	3.71	4.11	5.10	4.25
12. Lathing	1.19	4.07	3.18	4.60	1.97	2.43	.80	2.07	1.34	1.21	(L)	1.55	1.48	1.54	1.95	1.57	2.54	1.70	1.70	2.56	2.13	1.95	2.46	2.82	2.35	2.02
13. Masonry	1.40	5.58	3.98	2.99	3.33	3.97	1.05	2.26	1.82	1.08	3.00	2.04	1.63	1.70	2.24	1.44	3.31	2.78	2.59	5.10	2.15	2.52	6.83	3.30	2.74	2.09
14. Painting (J)	1.85	5.29	4.42	4.80	3.39	3.42	1.25	3.16	1.84	1.86	4.20	2.54	2.83	1.98	2.89	2.84	3.69	2.71	2.39	(K)11.48	3.56	3.26	3.21	3.52	4.00	3.44
15. Plastering	1.40	3.57	3.48	4.60	2.42	2.62	.80	2.69	1.82	1.13	3.10	1.95	1.78	1.82	2.40	1.84	2.78	2.06	2.10	3.10	2.03	2.47	2.46	3.13	2.85	2.46
16. Plumbing	.93	2.40	2.21	1.84	1.73	1.97	.60	1.75	1.23	.78	2.24	1.32	1.24	1.53	1.49	1.16	2.38	1.41	1.73	1.72	1.36	2.26	2.94	1.44	2.07	1.79
17. Roofing	4.71	9.78	10.41	9.24	7.18	9.39	1.25	6.13	3.93	3.23	10.61	9.03	4.94	7.32	8.00	6.06	8.45	7.01	7.40	10.40	10.77	10.19	8.42	3.98	9.82	8.26
18. Sheet metal erection	1.70	4.53	4.07	2.99	2.48	3.23	1.25	2.51	1.79	1.51	3.18	2.35	1.86	2.09	2.38	2.22	3.82	2.11	2.24	1.71	2.43	2.10	6.25	2.39	2.90	3.15
19. Steel erection — general	7.91	20.31	16.51	8.68	11.12	12.32	4.25	15.97	8.21	5.15	15.12	8.81	6.46	10.69	10.26	7.41	10.85	9.06	8.84	16.88	11.32	10.09	19.06	9.30	13.87	11.22
20. Steel erection — structural	8.29	20.31	21.01	16.04	18.04	12.89	4.25	19.84	10.87	7.80	21.31	8.81	8.14	11.72	16.04	13.11	16.76	11.11	10.64	20.34	22.68	11.90	32.39	15.84	19.98	15.67
21. Steel erection — interior ornamental	1.73	3.89	4.45	3.57	2.83	3.49	4.25	3.98	2.15	1.71	(L)	2.60	2.14	2.19	2.83	2.27	3.71	2.43	2.42	3.18	2.83	3.18	7.35	3.49	3.39	2.90
22. Steel erection — dwellings, 3 stories or less	4.16	8.04	11.61	16.04	6.90	8.73	4.25	7.22	5.56	4.65	9.84	6.97	5.20	5.30	7.68	6.19	9.31	6.22	6.32	16.88	8.85	7.61	14.77	9.65	9.18	7.42
23. Tile laying	.79	2.46	2.04	1.40	1.27	1.65	.45	2.26	1.01	.81	1.59	1.10	.94	1.03	1.25	1.00	1.66	1.12	1.27	1.60	1.91	1.59	1.39	1.44	1.45	1.32
24. Watchmen and timekeepers (I)	1.75	4.07	3.75	(G)	2.91	3.61	(G)	3.02	2.24	1.81	3.65	2.76	2.14	2.27	2.83	2.27	3.74	2.49	2.44	3.52	3.01	3.23	5.41	3.51	3.35	2.97
25. Waterproofing	2.24	4.94	5.39	4.46	3.66	4.33	(L)	3.81	2.77	2.15	(L)	3.34	2.76	2.78	3.68	3.02	4.64	3.09	3.10	4.81	4.03	3.96	3.33	4.44	4.56	3.75
26. Wrecking	10.12	28.43	24.44	21.22	16.72	20.29	11.20	17.31	13.64	9.47	(L)	17.75	11.03	12.77	12.64	13.26	21.00	14.03	16.14	17.97	41.10	15.08	23.44	22.25	20.39	16.97

Classification of Work (A)	Nev.(F)	N. H.	N. J.	N. M.	N. Y.	N. C.	N.D.(F)	Ohio(F)	Okla.	Ore.(H)	Pa.	R. I.	S. C.	S. D.	Tenn.	Tex.	Utah	Vt.	Va.	Wash.(H)	W.Va.(F)	Wis.	Wyo.(F)
1. Carpentry — private residences	State Insurance Plan Nevada Industrial Commission, Carson City, Nev.	2.05	4.80	2.59	7.44	2.49	North Dakota State Plan: Workmen's Compensation Bureau, Bismarck, N. D.	Ohio State Plan: Workmen's Compensation, The Industrial Commission of Ohio, Actuarial Section, Columbus, Ohio	5.43	6.36	1.85	4.48	3.35	3.18	2.30	3.87	3.00	1.95	1.91	4.59	West Virginia State Plan: State Compensation Commission, Charleston, W. Va.	4.05	Wyoming State Plan: Manager, Workmen's Compensation Dept., State Treasurer's Office, Cheyenne, Wyo.
2. Carpentry — dwellings, 3 stories or less		2.05	4.80	2.59	7.44	2.49			5.43	6.36	1.85	4.48	3.35	3.18	2.30	7.19	3.00	1.95	1.91	4.59		4.05	
3. Carpentry — interior trim		1.27	3.20	1.27	7.44	1.33			2.89	2.94	1.85	2.63	1.66	1.17	1.22	2.98	3.00	.86	1.00	1.50		4.05	
4. Carpentry — general		4.09	6.00	4.15	7.44	3.26			6.84	7.49	1.85	10.36	6.77	3.18	3.88	7.19	3.00	3.18	3.49	6.08		4.05	
5. Concrete and cement walk laying (B)		1.56	3.20	1.58	4.12	1.33			3.55	3.19	(L)	3.18	2.33	1.43	1.49	2.60	2.42	1.09	1.14	2.30		2.23	
6. Concrete work — general (B)		4.20	9.00	3.65	7.67	2.85			11.92	6.69	4.25	7.50	7.35	3.75	3.00	7.19	6.50	2.38	3.28	5.15		4.15	
7. Concrete work — dwellings, 3 stories or less (B)		2.87	6.80	1.96	7.67	1.44			4.73	5.83	4.25	4.90	2.79	1.44	1.65	7.19	4.00	2.21	1.42	4.48		2.57	
8. Electric wiring		1.34	1.80	1.35	2.73	1.25			3.33	3.29	1.30	2.36	2.15	1.22	1.45	2.37	2.00	.94	1.10	2.53		1.97	
9. Excavation — earth (C)		3.21	6.80	4.13	7.15	2.23			5.61	7.46	2.35	8.03	4.10	2.47	2.13	6.35	6.50	2.66	1.93	5.39		4.01	
10. Excavation — rock (D)		4.35	9.50	4.42	10.93	6.43			10.04	(L)	2.35	9.81	6.64	(L)	4.13	8.11	7.02	2.95	3.60	10.49		7.49	
11. Glazing		3.50	6.00	3.55	10.27	3.42			8.02	6.73	1.25	7.82	5.33	2.91	3.34	6.83	2.00	2.39	2.63	5.17		7.04	
12. Lathing		1.68	4.50	1.69	3.00	1.63			3.86	5.72	1.25	3.63	2.46	1.46	1.63	3.96	3.04	1.15	1.28	4.04		3.22	
13. Masonry		2.87	6.90	1.96	8.00	1.52			4.73	5.83	1.95	4.90	2.67	1.44	1.65	7.19	4.30	2.21	1.19	4.48		2.57	
14. Painting (J)		2.38	6.90	2.67	8.17	2.20			4.94	6.67	2.50	6.10	3.71	2.43	2.23	3.35	2.75	1.78	2.05	5.13		2.57	
15. Plastering		2.07	4.50	2.04	6.39	1.76			4.41	5.72	1.25	4.57	2.70	1.82	1.79	4.47	5.50	1.41	1.28	4.04		2.24	
16. Plumbing		1.54	3.00	1.87	3.54	1.04			2.92	2.91	1.20	2.60	1.82	1.37	1.16	2.71	1.50	1.22	1.26	2.24		1.58	
17. Roofing		7.16	9.90	6.62	19.06	3.91			17.99	15.59	2.50	14.73	9.18	5.55	4.45	10.44	9.08	4.56	5.14	(L)		10.30	
18. Sheet metal erection		2.07	3.30	2.10	5.68	1.87			4.18	6.42	2.50	4.25	2.84	1.82	1.91	3.22	4.00	1.44	1.79	4.59		3.81	
19. Steel erection — general		9.30	12.80	8.84	20.49	11.35			20.38	......	7.50	21.70	13.40	7.04	9.07	13.49	15.00	6.23	6.10	12.98		10.50	
20. Steel erection — structural		13.01	19.10	14.02	31.88	12.96			29.21	25.39	7.50	27.41	19.82	9.94	10.48	28.85	15.00	8.70	9.88	19.52		12.55	
21. Steel erection — interior ornamental		2.41	(L)	2.43	5.09	2.33			5.62	5.94	7.50	5.30	3.48	2.11	2.36	5.49	3.00	1.65	1.82	4.57		3.90	
22. Steel erection — dwellings, 3 stories or less		6.22	10.10	6.32	12.64	5.79			13.20	12.19	7.50	14.03	9.98	4.86	5.88	28.85	9.94	4.39	4.76	9.53		9.11	
23. Tile laying		1.12	1.85	1.11	4.15	1.01			2.52	2.10	.80	2.24	1.51	1.03	1.07	1.92	3.80	.77	.85	1.62		1.54	
24. Watchmen and timekeepers (I)		2.44	(L)	2.47	9.48	2.33			5.62	5.45	(G)	5.20	3.01	2.28	2.40	(G)	3.98	1.69	1.80	4.69		4.44	
25. Waterproofing		3.07	5.80	3.14	8.37	3.06			7.00	4.70	(L)	6.97	4.04	2.48	2.92	5.92	4.97	2.10	2.81	(L)		5.38	
26. Wrecking		14.09	26.70	14.27	(M)	13.71			30.30	32.43	20.00	29.51	20.61	11.82	13.51	25.98	37.54	9.57	10.98	24.98		34.84	

Note: Base rates — in effect April 1, 1945 — subject to increase or decrease according to experience ratings. (A) Special rates for government projects. (B) Includes construction of forms. (C) Includes blasting, but not caisson or cofferdam work. (D) Special rates for occupational disease coverage. (E) Employers liability rates — no compensation law. (F) Compensation must be insured in Monopolistic State Fund. [illegible] principal classification. (H) Operation specified as hazardous by law must be insured in State Fund. [illegible]

They taught Oil and Rubber to GET ALONG and made a better piston packing cup

he wide range of service conditions that piston packing ps must meet in industry calls for something special in vice qualities. Wabco packing *has* these qualities—anks to Westinghouse research activities.

Various materials were investigated in an extended arch for the best packing material. Rubber had the eatest promise, but it couldn't stand oil. The Re-arch Department kept digging, and ally came up with a formula that uld live with lubricants and still re-in its resilience, mechanical strength d sealing properties under severe serv-e conditions.

In addition to these service qualities, abco packing offers an important ex-usive mechanical feature. Built-in mited compression, available in cups from 1-inch to $7\frac{1}{2}$-inch, assures low friction.

Wabco packing cups are available in sizes from $\frac{3}{4}$-inch to 30-inch, for original installation in pneumatic cylinders; from $1\frac{3}{16}$-inch to 7-inch for hydraulic cylinders. If your product includes such cylinders, you will find Wabco cups an economical, simple, and dependable solution of your packing problems.

WESTINGHOUSE AIR BRAKE COMPANY
INDUSTRIAL DIVISION

General Offices:
WILMERDING, PA.

WABCO PACKING
COMPRESSORS
PNEUMATIC CONTROLS

Construction Equipment Rental Rates

EQUIPMENT RENTAL RATES were established May 11, 1942 by the Maximum Price Regulation No. 134 with rates fixed at about those of the Associated Equipment Distributors "Green Book."

As revised under dates of Oct. 16 and Nov. 23, 1942, and Feb. 1, 1945, the regulation list dollar and cents maximum rental rates for month, week or day for machines commo construction. Rates given are for actual use of not more th 8 hours in a calendar day with a maximum of 50 perc added for use up to 16 hours and 100 percent up to 24 ho Prices are for machines "bare" without fuel, lubricants operators, or for repairs or maintenance charges.

Sample equipment rental rates from Maximum Price Regulation No. 134 through Amendment No. 17

	Per Month	Per Week	Per Day
Air Compressors			
Portable, gasoline 105–106 cu. ft. 100 psi	$185	$62	$15.50
Portable, gasoline 160–210 cu. ft. 100 psi	260	87	21.75
Portable, diesel 160–210 cu. ft. 100 psi	298	99	25.00
Portable, diesel 425–500 cu. ft. 100 psi	608	203	51.00
Stationary, electric 160–215 cu. ft. 100 psi	155	52	13.00
Stationary, electric 470–570 cu. ft. 100 psi	280	93	23.00
Stationary, electric 900–1200 cu. ft., low pressure	365	121	30.00
Air Tools			
Clay spades, small	20	10	2.50
Drifters	65	22	6.00
Hoists to 1500-lb. single-drum	50	18	4.50
Hoists, 1500–2500 lb. double-drum	80	27	6.50
Hose, over ⅝ in. 50-ft. length	6	3	1.50
Jack-hammer 51–68 lb.	35	12	3.00
Paving breakers 70–90 lb	35	15	3.50
Rivet hammers	25	10	3.50
Vibrators, concrete, rigid type	50	16⅔	4.25
Wagon drill (with air hoist)	165	50	10.00
Boilers			
Vertical 18–24 hp	75	25	6.25
Vertical 32–55 hp	100	33	8.50
Horizontal 55–70 hp	110	37	9.00
Horizontal 90–125 hp	175	58	15.00
Buckets			
Clamshell ⅜ cu. yd	67	22	5.50
Clamshell ¾ cu. yd	90	30	7.50
Clamshell 1½ cu. yd	140	46	11.50
Concrete bottom-dump 1 cu. yd	35	11½	3.00
Concrete bottom-dump 2 cu. yd	50	16¾	4.25
Dragline 1 cu. yd	85	28	7.00
Dragline 1½ cu. yd	105	35	8.75
Dragline 2 cu. yd	125	42	10.50
Orangepeel 1¼ cu. yd	175	58	14.50
Bulldozers—see tractors			
Concrete carts 6 cu. ft. rubber tired	12	4	.....
Concrete carts 9–11 cu. ft. rubber tired	15	5	.....
Cranes (capacity at ft. radius)			
Crawler gasoline 4¾–7¾ ton 12	450	150	38.00
Crawler gasoline 14½–19½ ton 12	675	225	56.00
Crawler gasoline 18½–26 ton 20	1,400	467	117.00
Crawler diesel 14½–19½ ton 12	800	267	62.00
Crawler diesel 18½–26 ton 20	1,700	567	142.00
Crawler diesel 14½–20 ton 45	2,725	908	227.00
Crawler steam 18½–24½ ton 12	725	242	60.00
Locomotive gas 27–32 ton 12	1,300	430	108.00
Locomotive steam 27–32 ton 12	1,180	393	98.00
Truck-mounted gas 7–9 ton 10 (per hour $5.50)	700	230	58.25
Truck-mounted gas 12–14½ ton 10 (per hr. $6.00)	925	300	77.00
Crushers (without accessories or power)			
Openings 9x16	85	28	7.00
Openings 10x30	190	63	16.00
Openings 12x36	265	88	22.00
Derricks			
Stiff-leg wood 3½–4½ ton	100	33	8.50
Stiff-leg steel 4–6 ton 50–80 ft. boom	215	72	18.00
Stiff-leg steel 13–17 ton–100 ft. boom	390	130	33.00
Stiff-leg steel 32–42 ton 70–100 ft. boom	555	185	46.00
Guy 13–17 ton 70–110 ft. boom	245	82	20.00
Guy 35–45 ton 100-120 ft. boom	450	150	37.00
Engines			
Gasoline with clutch 22–30 hp	50	17	4.50
Gasoline with clutch 55–70 hp	90	30	7.50
Diesel with clutch 22–30 hp	75	25	6.50
Diesel with clutch 55–70 hp	135	45	11.00
Diesel with clutch 90–115 hp	245	82	20.00
Finegraders 11–16 ft. width (self-powered)	650	216⅔	70.75
Finishing machines			
Concrete-floor (powered)	60	20	5.00
Road finishers 12–18 ft. roadway	447	149	37.25
Road finishers 24–30 ft. roadway	495	165	41.25
Bituminous machines	750	250	63.00
Graders			
Single drive—8,600 to 14,000 lb. gasoline	275	92	23.00
Tandem drive 19,000–21,000 lb. gasoline	470	156	39.00
Tandem drive 17,500–21,500 lb. diesel	525	173	42.00
Towed-power operated 9–11 ft.	190	63	15.75
Pile hammers			
Drop 1,500–2,250 lb.	20	7	2.00
McKiernan-Terry #2	60	20	5.00
McKiernan-Terry #7	140	46⅔	11.75

	Per Month	Per Week	P D
Pile Hammers (Cont'd)			
McKiernan-Terry #10B2 or 3	$270	$90	$22.
Vulcan #1	290	96⅔	24.
Vulcan #00	405	135	33.
Vulcan Pile Extractor #800	220	73⅓	18.
Tank Car Heater 2-3 car capacity	210	75	20.
Hoists			
Gasoline single-drum 29–42 hp	95	32	8.
Gasoline double-drum 22–28 hp	100	33	8.
Gasoline double-drum 55–65 hp	175	58	15.
Electric single-drum 17–27 hp	75	25	6.
Electric double-drum 37–47 hp	138	46	11.
Air 1,500–2,500 lb.	65	22	5.
Chain 1½–2½ ton	20	7	2.
Chain 4–6½ ton	30	10	2.
Mixers, Bituminous			
Central Plant 30–50 ton per hr. (gradation control)	1,573	524	131.
Central Plant 70–90 ton per hr. (gradation control)	2,217	739	185.
Traveling Plant 1¼–1¾ cu. yd. per min	1,085	362	90.
Mixers, Concrete			
Power charger 6S to 8½S	85	28	7.
Power charger 12S to 16S	155	52	13.
Batch hopper 25S to 30S	210	70	17.
Paver 27-E, 1- and 2-drum	935	311⅔	78.
Paver 34-E, single drum	1,335	445	111.
Pumpcrete (concrete pump) gasoline			
Model 160 single cylinder (no remixer)	466	155⅓	38.7
Model 200 double cylinder (with remixer)	1,322	440⅔	110.
Pumps			
Centrifugal, gasoline, 2 in. 7 to 10 M	40	13	3.
Centrifugal, gasoline, 4 in. 30 to 40 M	80	27	7.
Centrifugal, gasoline, 8 in. 125 M	195	65	16.
Diaphragm force or open 3 in. double	50	17	5.
Diaphragm force or open 4 in. double	60	20	5.
Rollers			
Two-wheel tandem 5–9½ ton gasoline	250	83	21.0
Two-wheel tandem 12½–17½ ton gasoline	325	108	27.0
Three-wheel 5½–6½ ton gasoline	200	67	16.0
Three-wheel 7½–9 ton gasoline	270	90	22.0
Three-wheel 11–13 ton gasoline	425	142	35.0
Sheepsfoot, double drum	90	30	7.50
Sheepsfoot, triple drum	175	58	15.00
Shovels and back-hoes (dipper included)			
Crawler, gasoline ⅜ cu. yd	440	147	37.00
Crawler, gasoline ¾ cu. yd	605	201	50.00
Crawler, gasoline 1¼ cu. yd	880	293	73.00
Crawler, diesel ¾ cu. yd.	715	238	60.00
Crawler, diesel 1¼ cu. yd	1,045	348	87.00
Crawler, diesel 2 cu. yd	1,980	660	165.00
Surveying instruments			
Levels	20	8	5.00
Transits	25	9	5.00
Tractor, crawler, and attachments			
33–41 hp. gasoline	265	88	22.00
66–85 hp. gasoline	425	142	35.00
46–52 hp. diesel	410	137	34.00
72–89 hp. diesel	645	215	54.00
89–135 hp. diesel	775	258	65.00
Winch, any size, double drum	75	25	6.50
Bulldozer 66–89 hp. tractor	120	40	10.00
Angledozer 66–89 hp. tractor	148	49	12.00
Tractors-wheeled			
4 wheel, rubber tired diesel 93–103 hp	530	175	45.00
4 wheel, rubber tired diesel 140–160 hp	855	285	70.00
2 wheel rubber tired diesel 145–160 hp	780	260	65.00
2 wheel rubber tired diesel 195–210 hp	1,385	461	115.00
Scrapers and Wagons (heaped measure)			
Scraper 7–10 cu. yd	250	85	21.00
Scraper 17–22 cu. yd	575	190	48.00
Scraper 29–37 cu. yd	1,025	340	85.00
Crawler wagons, bottom dump 9½–12½ cu. yd.	240	80	20.00
Crawler wagons, bottom dump 14½–20½ cu. yd.	370	123	31.00
Vibrators, gasoline, flexible shaft			
Up to 1½ hp. 28 ft. shafting	35	11⅔	3.00
3½–4½ hp., 46 ft. shafting	60	20	5.00
Welding Machines, wheels or skids			
Gasoline-engine driven up to 250 amp	74	25	6.00
Gasoline-engine driven 350 to 500 amp	114	38	9.50
60 cycle motor driven up to 250 amp	35	12	3.00
60 cycle motor driven 350 to 500 amp	56	19	4.50

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Index of Construction Machinery Prices

PRICES OF NEW construction machinery averaged 11 percent higher in December 1944 than in August 1939 according to a new Price Index for Construction Machinery constructed by the Bureau of Labor Statistics. This new index consists of a composite index and 9 sub-series for 9 basic classes of construction equipment. Based on August 1939 as 100, these were released for the first time at the end of February 1945 and new values are to be reported quarterly by BLS.

Price comparisons included in the index are based on changes in manufacturers' quoted list prices less customary trade discounts wherever such were applicable during the period covered. Prices were gathered for the predominating types of machinery used by the construction industry for portable plant operation in excavating, earthmoving and grading, and in road and airport construction. Track-laying tractors are of such importance in construction, that, though tractors are sometimes classed as a separate industry, a track-type tractor series has been included in the index.

Prices for 219 machines from 64 companies were used in computing the index. These individual price series were averaged, by type of machine, into sixty composite price series. These series, in turn, were combined into the nine groups shown in Table 2 at the right.

TABLE 1.—INDEX OF PRICES OF CONSTRUCTION MACHINERY
August 1939—December 1944
(August 1939 = 100)

	1939	1940	1941	1942	1943
January	....	100.6	103.2	110.5	110.5
February	....	100.6	103.6	110.5	110.5
March	....	100.6	104.2	110.5	110.5
April	....	100.8	105.0	110.5	110.5
May	....	100.9	105.5	110.5	110.5
June	....	100.9	106.2	110.5	110.5
July	....	101.3	106.5	110.5	110.5
August	100.0	101.2	108.3	110.5	110.5
September	100.0	101.4	109.3	110.5	110.5
October	100.1	102.3	110.0	110.5	110.5
November	100.4	102.3	110.4	110.5	110.5
December	100.5	102.3	110.4	110.5	110.5
Yearly Average	....	101.3	107.0	110.5	110.5

TABLE 2—INDEX OF PRICES OF CONSTRUCTION MACHINERY—BY GROUPS
For Selected Dates August 1939—December 1944
(August 1939 = 100)

	Aug. 1939	Dec. 1940	Oct. 1941	Dec. 1942	Dec. 1943
Constr. Equip., Tractor Mounted	100.0	100.3	108.8	108.8	108.8
Constr. Machinery, Specialized	100.0	101.1	110.8	111.5	111.8
Constr. Matl. Mixers, Pavers, Spreaders and Related Equip.	100.0	100.5	106.3	106.4	106.3
Construction Matl. Processing Equip.	100.0	100.6	110.9	112.7	112.7
Power Cranes, Draglines, Shovels, and Related Equip	100.0	101.4	110.5	110.9	110.9
Scrapers, Maintainers, and Graders	100.0	100.4	107.2	107.2	107.2
Drilling and Boring Machinery	100.0	100.0	100.0	100.0	100.0
Tractors, Track Type	100.0	106.0	113.4	114.4	114.4
Portable Air Compressors	100.0	100.7	100.0	98.4	97.9
Constr. Machinery—All Types	100.0	102.3	110.0	110.5	110.5

Where the equipment was of the type normally sold by the manufacturer direct to the user, calculations were based on quoted prices only. Special prices to resale machinery manufacturers were used in only a few cases, since little information was available concerning them, and because equipment sold at these prices is subsequently resold through dealers or direct to users.

The Bureau of Labor Statistics believes that the index will be of value to bidders in estimating cost of construction before bidding on ne work; that it will aid owners in es mating construction costs; that it wi aid government agencies in a gener way to measure the effectiveness o price controls during the war emergency, and that it will be of value t equipment manufacturers for studying the price trends of their machine compared with those of other manufacturers.

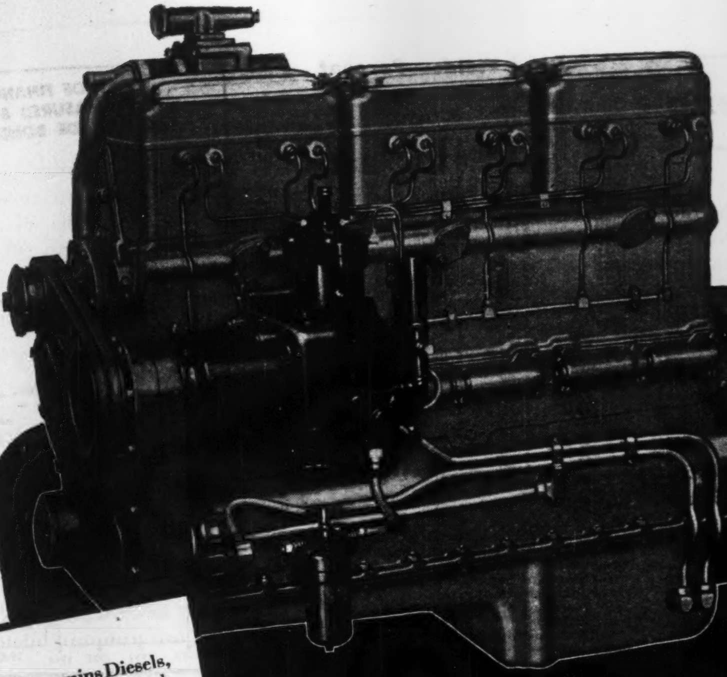
Cost Data on Federal Construction Projects

Bureau of Labor Statistics, Employment and Occupational Outlook Branch, Division of Construction and Public Employment

LABOR, MATERIALS, AND MAN-HOURS PER $1,000,000 OF COST FOR SPECIFIED TYPE OF FEDERAL CONSTRUCTION
(Projects completed or in process January 1944 to January 1945)

Type of Project	Expenditures (Thousands of Dollars): Labor at Constr. Site	Material	Total Labor and Mat'l.	Percent for Labor and Material: Labor	Material	Man-Hours Worked: At Constr. Site	Off-Site Labor	Total Man-Hours
Building Construction								
Residential	$385	$433	$818	38.5	43.3	284,100	426,200	710,300
Total Non-residential	359	462	821	35.9	46.2	284,200	426,300	710,500
Military buildings [1]	376	449	825	37.6	44.9	316,700	411,700	728,400
Factories [2]	381	454	835	38.1	45.4	292,900	410,100	703,000
Warehouses	346	479	825	34.6	47.9	284,200	426,300	710,500
Hospitals	385	440	825	38.5	44.0	319,000	478,500	797,500
Non-Building Construction:								
Water and sewerage systems	333	477	810	33.3	47.7	309,600	402,500	712,100
Streets, roads and highways	310	432	742	31.0	43.2	282,600	367,400	650,000
Airports [3]	307	450	757	30.7	45.0	285,200	427,800	713,000

[1] Includes barracks, mess halls, and recreation buildings at military posts and stations. [2] Private and public. [3] Excludes buildings.



Model H Cummins Diesels, 4⅞" x 6", four or six cylinders, develop their maximum 100 and 150 hp., pectively, at 1800 rpm. Designed —and proved in—various types wheel and track-mounted equip- ent and stationary applications.

NH

Series NH-600 and NHS-600 (supercharged) Cummins Diesels, 5⅛" x 6", develop maximum 200 and 275 hp., respectively, at 2100 rpm. Both are six-cylinder, dual valve engines . . . similar in design, weight and dimensions to the Model H. Automotive and industrial models.

L

Model L Cummins Diesel, 7" x 10", six cylinders, develops maximum 250 hp. at 1000 rpm. This heavy-duty, medium speed engine is designed for shovels, draglines, cranes, locomotives, etc., and for stationary applications and generating service.

READ the record! The record of Cummins Dependable Diesels in trucks, shovels, compressors, rock crushers, dredges and many other types of heavy-duty construction and material handling equipment. Read that record and you will find proof that Cummins-powered means "powered for profit."

CUMMINS ENGINE CO., INC., Columbus, Ind.

CUMMINS *Dependable* DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

Cost of Financing

COST OF construction money in 1944, as measured by yields of high-grade bonds, averaged the lowest ever reported for U. S. treasury, municipal and public utility bonds. Industrial bond yields were 1.2 percent higher than in 1943; and public utility yields were up 0.4 percent compared with last year, but under all other annual averages. Treasury bond yields were 3.0 percent below a year ago; municipal bond yields were 9.7 percent lower; and railroad bond yields decreased 2.9 percent.

The 1944 annual average yields for the various types of high-grade bonds in percent were: U. S. treasury, 1.92; municipal, 1.86; industrial, 2.58; public utility, 2.64; and railroad, 3.01.

In January 1945 bond yields for all five of the above types of bonds continued to decline from their respective December values. The January yields for U. S. treasury, municipal, industrial, public utility and railroad were: 1.81, 1.81, 2.54, 2.61, and 2.90 percent, in that order.

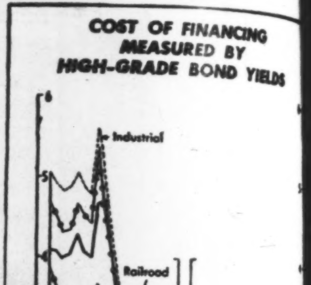
Commercial loan rates, or averages of rates charged by banks in principal cities, averaged 2.59 percent for the nineteen reporting cities in 1944, 5 percent below the 1943 value. The New York City average rate, 2.11 percent, compares with 2.30 percent last year. Seven northern and eastern cities' average rate, 2.68 percent, was under the 2.80 percent in 1943; and eleven southern and western cities reported a 1944 average of 3.02 percent compared with 3.13 percent in the preceding year according to Federal Reserve Bank statistics.

The 1944 fourth-quarter average for the nineteen reporting cities was 2.39 percent, 9.8 percent below the 1943 fourth-quarter average rate.

Bond Yields—Percent

	U. S. Treas. (1)	Municipal (2)	Industrial (3)	Pub. Util. (4)	Railroad (5)
1933	3.31	4.71	4.98	4.69	4.55
1934	3.12	4.03	4.28	4.19	4.01
1935	2.79	3.41	3.73	3.59	3.58
1936	2.69	3.07	3.34	3.38	3.31
1937	2.74	3.10	3.16	3.22	3.45
1938	2.61	2.91	2.82	2.99	3.60
1939	2.41	2.76	2.64	2.83	3.39
1940	2.26	2.50	2.57	2.75	3.26
1941	2.05	2.10	2.50	2.69	3.16
1942	2.09	2.36	2.54	2.71	3.17
1943	1.98	2.06	2.55	2.63	3.10
1944	1.92	1.86	2.58	2.64	3.01
1944 Jan.	1.95	1.92	2.54	2.67	3.07
Feb.	1.93	1.85	2.58	2.66	3.07
Mar.	1.91	1.84	2.59	2.65	3.06
Apr.	1.94	1.85	2.57	2.64	3.03
May	1.94	1.86	2.56	2.63	3.01
June	1.91	1.87	2.59	2.64	3.02
July	1.89	1.84	2.58	2.63	3.03
Aug.	1.90	1.82	2.57	2.64	3.01
Sept.	1.93	1.83	2.59	2.62	2.99
Oct.	1.93	1.87	2.60	2.63	2.98
Nov.	1.90	1.88	2.59	2.65	2.95
Dec.	1.87	1.87	2.58	2.62	2.93
1945 Jan.	1.81	1.81	2.54	2.61	2.90

(1) Aver. yield of long-term U. S. Treasury bonds, partially tax exempt, not due or callable for fifteen years.
(2) Standard Statistics & Poors — aver. 15 high-grade long-term municipals.
(3) Standard Statistics & Poors — aver. A1 plus industrials.
(4) Standard Statistics & Poors — aver. A1 plus public utilities.
(5) Standard Statistics & Poors — aver. A1 plus railroads.



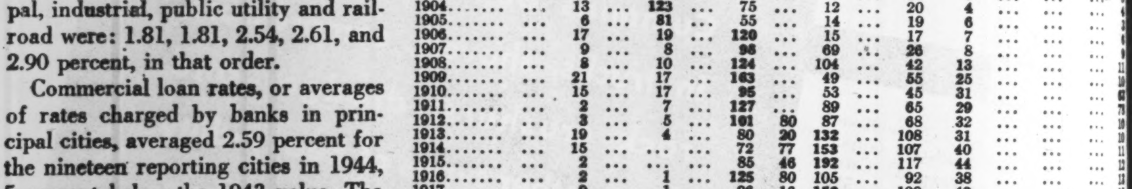
COST OF FINANCING MEASURED BY HIGH-GRADE BOND YIELDS

Rate of Interest*

Municipal Bond Sales in the U. S. from Commercial & Financial Chronicle
(Millions of Dollars — 000,000 Omitted)

Year	2%	3%	3¼%	3⅓%	3¾%	4%	4¼%	4½%	4¾%	5%	5¼%	5½%	5¾%	6% & over
1901	...	11	...	**69**	...	28	...	5	...	9	3	...	...	...
1902	...	12	...	**77**	...	34	...	4	...	10	2	...	...	...
1903	...	17	...	**35**	...	47	...	9	...	14	5	...	...	...
1904	...	13	...	**123**	...	75	...	12	...	20	4	...	...	...
1905	...	6	...	**81**	...	55	...	14	...	19	6	...	...	...
1906	...	17	...	19	...	**120**	...	15	...	17	7	...	...	...
1907	...	9	...	8	...	**98**	...	69	...	26	8	...	...	...
1908	...	8	...	10	...	**124**	...	104	...	42	13	...	...	...
1909	...	21	...	17	...	**163**	...	49	...	55	25	...	...	...
1910	...	15	...	17	...	**95**	...	53	...	45	31	...	...	...
1911	...	2	...	7	...	**127**	...	89	...	65	29	...	...	...
1912	...	3	...	5	...	**101**	80	87	...	68	32	...	...	...
1913	...	19	...	4	...	80	20	**132**	...	108	31	...	...	...
1914	...	15	...	...	...	72	77	**153**	...	107	40	...	...	...
1915	...	2	...	...	...	85	46	**192**	...	117	44	...	...	...
1916	...	2	...	1	...	**125**	80	105	...	92	38	...	...	...
1917	..	9	...	1	...	96	16	**150**	...	120	42	...	...	...
1918	...	2	...	...	...	19	4	69	...	**98**	74	...	...	...
1919	...	4	...	...	...	19	22	132	28	**278**	150	...	...	...
1920	...	...	...	15	...	24	3	71	9	194	**333**	...	...	...
1921	...	...	...	...	...	53	3	125	36	330	**656**	...	...	...
1922	...	1	...	...	...	105	131	219	56	**307**	252	...	...	...
1923	...	...	...	...	...	98	102	**272**	138	237	203	...	...	...
1924	...	...	4	...	...	150	**339**	294	109	281	203	...	...	...
1925	...	...	1	...	...	270	302	**314**	76	202	201	...	...	...
1926	...	...	...	...	...	212	287	**342**	76	215	199	...	...	...
1927	...	16	10	...	...	**361**	321	336	79	180	160	...	...	...
1928	...	...	37	...	...	365	**384**	281	68	150	111	...	...	...
1929	...	3	65	...	...	107	133	**449**	132	250	281	...	...	...
1930	...	2	60	...	...	338	326	**341**	150	155	97	...	...	...
1931	...	92	...	181	...	241	**311**	197	51	99	77	...	...	...
1932	...	31	...	19	...	68	56	151	73	122	**322**	...	...	...
1933	...	32	15	29	39	**131**	48	51	22	61	3	20	3	52
1934	84	107	94	54	72	**197**	54	75	41	88	13	23	4	13
1935	161	**349**	62	137	71	234	40	50	22	26	3	3	2	9
1936	211	**343**	71	156	35	212	14	23	3	16	1	1	...	2
1937	73	**422**	55	95	50	134	26	13	3	7	1	1	...	1
1938	**360**	256	105	102	54	149	21	11	8	8	3	...	1	1
1939	**446**	282	80	58	30	128	71	8	2	4	...	1	...	1
1940	437	**446**	84	80	55	90	16	8	1	2	...	...	...	1
1941	**450**	214	120	48	27	53	6	3	2	2	...	...	...	...

Bold face type indicates interest rates on which bulk of financing was done for year.
* Temporarily discontinued by reporting source.



COMMERCIAL LOAN RATES
Averages of Rates Charged by Banks in Principal Cities

Note: Quarterly figures for 1939 through 1944 on revised basis and not strictly comparable with earlier monthly series. Indicate trend only

Data Federal Reserve Board

Chart ENR Business News

Index of Small House Costs

E INDEX of building costs for the
ndard 6-room frame house in ap-
ximately 75 cities is computed
nthly by the Federal Home Loan
nk Administration. The cities, in-
idual indexes for which are tabu-
d on the following page, are di-
ed into three groups and one group
eported each month.

he combined index of small house
s for the United States is based
these 75 city reports, and is com-
d in the following manner: To
average cost for each month, for
reporting cities in that month, is
ed the cost for the previous month
m the prior reporting cities and
cost in the subsequent month for
third reporting group. The arith-
ic average for the three reporting
ups is taken as the average cost
the middle month for the entire
ion. This 3-month moving average
omputed and reported monthly.

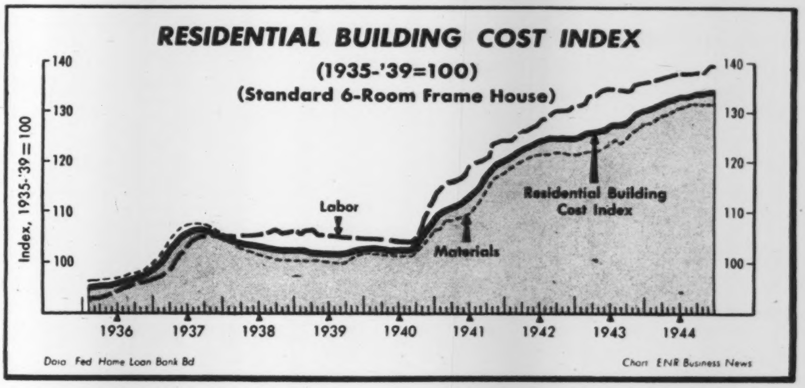
his index is designed to measure
changes in the cost of construct-
a standard frame house and to
vide a basis for the study of the
nd of costs within an individual
munity or in different cities. The
ious units of materials and labor
selected in accordance with their
tribution to the total cost of the
pleted dwelling.

aterial costs are based on prices
a limited bill of the more impor-
t items. Current prices are fur-
hed by the Bureau of Labor Statis-
and are based on information
m a group of dealers in each city
o report on prices for materials
ivered to job site, in average quan-
es, for residential construction. Be-
se of wartime conditions, some of
regular items are not available
times and the substitution must be
de of similar products being sold.

Labor costs are based on the rates
vailing for residential construction
d reflect total earnings, including
ertime and bonus pay.

The index measures only the trend
the cost of constructing the funda-
ntal elements of the house. It does
give consideration to the cost of
d, landscaping, or providing
lks or driveways. The same is true
architects' fees, cost of building
mit, financing charges and sales
ts.

Indexes of Building Costs for Standard 6-Room Frame House (1935-1939 = 100) Fed. Home Loan Bank Admin.



Data Fed Home Loan Bank Bd

Chart ENR Business News

Combined Index

	1936	1937	1938	1939	1940	1941	1942	1943	1944
January	94.7	99.6	104.3	101.9	102.3	109.3	120.6	124.7	130.6
February	94.9	100.9	103.8	102.0	102.4	110.2	121.2	125.5	131.4
March	95.0	102.6	103.5	102.1	102.3	110.4	122.0	125.7	131.7
April	95.3	104.2	103.1	101.8	102.1	111.2	122.3	125.7	132.2
May	95.6	105.0	102.8	101.6	102.2	111.6	122.8	126.2	132.7
June	95.8	105.8	102.8	101.4	102.1	112.4	123.5	126.8	133.0
July	96.2	106.3	102.7	101.3	102.0	113.6	123.7	127.3	133.1
August	96.6	106.4	102.3	101.2	102.1	115.1	124.0	127.1	133.3
September	96.8	106.3	102.3	101.6	102.9	116.5	124.4	127.6	133.7
October	97.1	106.0	102.1	102.0	104.6	118.5	124.5	129.1	133.8
November	97.7	105.7	102.1	102.4	106.4	119.2	124.4	129.8	134.2
December	98.5	104.9	102.0	102.5	108.1	119.9	124.5	130.5	134.3
Average	**96.2**	**104.5**	**102.8**	**101.8**	**103.3**	**114.0**	**123.2**	**127.2**	**132.8**

Material Index

	1936	1937	1938	1939	1940	1941	1942	1943	1944
January	95.8	101.0	104.1	100.0	101.4	106.6	118.6	121.5	127.8
February	96.0	102.5	103.3	100.0	101.5	107.8	119.3	121.9	128.8
March	96.2	104.5	102.6	100.0	101.4	108.0	120.0	122.0	129.1
April	96.3	105.9	102.1	99.9	101.3	108.7	120.5	121.8	129.7
May	96.5	106.8	101.7	99.7	101.3	108.8	121.0	122.2	130.3
June	96.6	107.0	101.5	99.5	101.3	109.2	121.3	123.0	130.7
July	97.0	107.2	101.1	99.4	101.2	110.7	121.2	123.7	131.0
August	97.4	107.3	100.4	99.3	101.4	112.6	121.2	123.4	131.3
September	97.5	107.1	100.4	99.9	101.9	114.4	121.5	124.4	131.2
October	97.8	106.5	100.2	100.6	103.4	116.0	121.6	126.0	131.4
November	98.4	106.0	100.2	101.3	104.6	116.9	121.5	126.8	131.5
December	99.5	104.9	100.0	101.5	105.9	117.7	121.4	127.6	131.6
Average	**97.1**	**105.6**	**101.5**	**100.1**	**102.2**	**111.5**	**120.8**	**123.7**	**130.4**

Labor Index

	1936	1937	1938	1939	1940	1941	1942	1943	1944
January	92.6	96.9	104.7	105.6	104.0	114.5	124.5	130.9	136.1
February	92.6	97.6	104.7	105.9	104.2	115.1	125.0	132.5	136.5
March	92.7	98.9	105.2	106.1	104.1	115.3	126.0	133.0	136.8
April	93.2	100.7	105.2	105.6	103.8	116.1	125.9	133.4	137.0
May	93.8	101.7	105.1	105.3	103.7	117.0	126.4	134.2	137.3
June	94.3	103.3	105.3	105.0	103.5	118.6	127.8	134.3	137.5
July	94.7	104.4	105.7	105.1	103.4	119.3	128.5	134.3	137.3
August	94.9	104.7	106.0	104.9	103.6	120.0	129.4	134.2	137.3
September	95.3	104.8	106.1	104.9	104.8	120.7	130.2	133.8	138.5
October	95.8	105.0	105.8	104.8	106.9	123.3	130.2	135.0	138.5
November	96.3	105.0	105.8	104.6	109.8	123.9	130.2	135.6	139.5
December	96.4	104.8	105.8	104.4	112.5	124.2	130.7	136.0	139.7
Average	**94.4**	**102.3**	**105.4**	**105.2**	**105.4**	**119.0**	**127.9**	**133.9**	**137.7**

Index of Costs for Standard House in Representative Cities — 1935-1939 = 100

Federal Home Loan Bank Board

	1940				1941				1942				1943				1944			
	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.
Albany, N. Y	102.2	103.3	102.5	102.9	112.3	119.4	120.6	122.5	124.6	123.2	130.9	134.2	130.2	130.4	137.6	140.6	140.6	140.4	143.8	.....
Atlantic City, N. J	105.4	102.4	100.7	103.9	118.7	120.6	120.6	122.1	122.7	124.9	125.3	125.4	125.4	125.6	138.0	138.0	136.9	138.4	137.5	.....
Boise, Idaho	105.6	106.2	106.5	108.4	111.6	112.4	117.5	118.0	120.9	126.2	126.0	126.0	125.9	126.4	126.9	127.3	133.2	133.2	133.6	133.8
Buffalo, N. Y	100.6	100.9	101.1	101.6	108.8	112.0	117.3	121.6	123.7	125.4	128.2	128.1	128.2	130.8	130.2	134.7	135.8	140.0	142.1	.....
Camden, N. J	108.5	108.8	108.8	114.2	117.1	117.3	126.6	139.2	139.7	138.8	138.9	138.9	138.1	137.3	136.4	135.6	138.8	140.7	143.6	.....
Casper, Wyo	101.5	98.8	95.0	95.0	101.7	100.5	100.8	101.8	103.6	103.6	103.4	.....	.....	.....	.....	.....	111.7	111.7	111.7	.....
Des Moines, Iowa	102.6	102.6	102.8	104.8	105.2	106.0	106.1	111.3	113.8	115.2	116.7	116.7	116.3	116.1	116.1	116.0	118.3	118.4	121.1	121.1
Detroit, Mich	101.9	102.0	102.4	105.1	112.0	108.7	112.3	119.2	119.6	122.1	122.1	128.2	128.2	130.4	130.4	142.1	148.4	149.6	152.6	152.1
Duluth, Minn	104.9	104.8	104.3	104.3	104.5	104.5	107.8	109.6	110.8	112.8	118.4	118.1	118.5	118.5	118.5	118.5	122.9	123.0	125.7	.....
Evansville, Ind	107.1	107.0	107.0	110.7	112.3	113.4	114.4	119.7	122.3	126.4	126.4	126.2	126.4	126.4	.....	126.4	125.3	125.3	125.3	125.3
Fargo, N. D	102.6	102.4	100.7	100.8	102.6	104.9	105.6	108.8	111.5	115.8	117.5	118.8	121.1	122.3	122.3	122.4	123.9	124.7	125.1	124.3
Grand Rapids, Mich	99.6	100.0	102.6	106.8	116.1	117.5	118.5	120.2	121.9	127.1	127.0	128.5	128.6	127.8	.....	128.5	131.1	131.1	131.1	131.1
Great Falls, Mont	102.3	101.5	101.3	101.3	105.1	107.4	107.2	111.0	111.6	112.8	112.8	.....	.....	.....	114.0	.....	118.8	118.8	118.8	.....
Indianapolis, Ind	98.5	96.8	96.9	99.1	115.0	116.5	117.4	121.5	122.6	126.1	126.4	128.5	125.4	125.9	125.9	129.9	143.0	143.5	146.4	146.5
Kansas City, Mo	107.0	106.6	104.5	103.0	110.8	110.5	110.9	116.2	118.7	125.6	125.7	129.4	129.7	.....	.....	.....	138.0	137.6	137.6	.....
Newark, N. J	106.6	106.6	106.7	107.0	113.2	114.7	131.1	135.8	136.5	137.0	146.3	153.9	155.5	156.1	149.7	149.7	154.5	157.1	159.3	.....
Portland, Ore	97.9	97.6	97.5	99.3	100.1	102.1	103.7	111.9	114.6	116.0	121.1	128.0	134.9	134.1	133.6	133.1	140.1	142.6	142.5	146.1
St. Louis, Mo	100.1	99.3	100.1	103.1	108.7	109.2	111.4	119.6	120.5	125.4	126.5	121.0	120.8	120.9	119.0	119.2	119.5	123.4	123.0	124.6
St. Paul, Minn	107.8	107.3	107.1	107.5	108.1	108.0	109.7	112.7	114.7	115.9	118.7	118.7	119.1	119.2	119.2	119.2	121.9	121.9	124.6	.....
Salt Lake City, Utah	103.1	102.8	102.7	103.8	103.8	106.2	111.7	116.6	118.3	119.6	120.1	120.1	119.7	122.8	122.9	122.3	123.3	126.8	126.8	130.0
Seattle, Wash	102.9	103.6	103.3	103.4	107.0	110.6	112.7	119.7	122.7	123.8	122.1	122.1	124.4	126.6	130.6	132.1	131.5	133.7	134.6	138.9
Sioux Falls, S. D	102.2	101.5	103.3	105.0	105.5	108.3	111.1	114.7	117.4	119.4	124.2	126.3	125.9	126.2	126.2	126.5	127.7	127.7	130.4	130.6
South Bend, Ind	102.9	104.6	104.5	107.8	115.3	114.8	117.8	120.6	128.4	131.2	131.2	132.3	132.5	132.5	.....	132.5	143.4	143.4	143.4	143.4
Spokane, Wash	101.4	101.4	101.5	102.2	110.8	110.7	111.5	115.1	115.4	121.7	121.6	.....	121.8	.....	.....	.....	122.9	122.9	122.9	.....
White Plains, N. Y	100.1	99.8	99.2	102.2	112.7	114.2	117.0	123.7	124.3	125.0	125.2	127.8	129.0	129.7	129.7	136.2	141.5	148.7	149.1	.....

	1940				1941				1942				1943				1944			
	Feb.	May	Aug.	Nov.	Feb.	May.	Aug.	Nov.	Feb.	May	Aug.	Nov.	Feb.	May	Aug.	Nov.	Feb.	May	Aug.	Nov.
Albuquerque, N. M	98.6	97.8	98.6	99.5	99.8	100.4	102.6	112.3	115.4	116.4	116.6	116.5	116.0	116.0	116.0	122.8	125.4	125.5	123.5	123.5
Charleston, W. Va	101.9	102.1	101.3	106.8	108.7	110.2	108.2	115.8	116.2	119.6	122.2	122.2	122.0	122.2	121.9	122.3	122.3	124.0	125.5	126.3
Cincinnati, Ohio	96.7	96.5	97.4	100.5	100.3	99.4	103.4	111.0	111.1	113.1	111.9	112.0	112.0	112.3	112.3	130.7	131.2	133.9	.....	134.6
Cleveland, Ohio	106.9	105.3	108.4	110.0	110.5	116.3	121.3	124.7	125.2	127.1	127.3	128.1	128.3	128.9	137.7	139.3	140.4	142.1	142.1	143.3
Columbus, Ohio	101.4	101.5	100.6	103.4	104.3	107.5	111.4	115.6	115.7	116.9	117.2	117.6	117.6	117.7	117.7	132.1	129.7	129.6	.....	127.8
Dallas, Tex	94.6	94.5	94.6	105.2	115.7	117.3	119.2	131.5	134.3	128.3	128.0	128.8	129.0	129.0	.....	.....	136.0	136.0	.....	.....
Houston, Tex	101.0	100.5	96.8	104.9	106.3	107.6	108.9	118.1	119.5	116.1	115.9	116.6	116.2	116.2	116.5	121.5	123.1	123.6	124.3	124.3
Jackson, Miss	105.4	106.3	106.3	109.6	113.5	117.7	118.9	121.1	122.6	122.7	122.7	122.7	123.4	123.5	123.9	127.7	130.8	135.3	135.0	136.4
Little Rock, Ark	99.8	99.6	98.9	103.1	104.3	105.3	106.3	117.0	119.9	120.5	123.6	123.6	123.1	123.2	123.4	123.7	123.3	125.5	126.1	126.2
Los Angeles, Calif	95.4	95.3	95.4	100.8	101.6	102.7	105.4	109.0	114.9	120.3	128.1	131.3	134.1	133.2	133.9	142.0	143.1	144.4	144.3	144.3
Louisville, Ky	104.1	104.8	104.4	107.0	116.9	116.7	119.0	122.0	122.9	124.4	125.3	126.8	127.6	128.3	128.8	133.0	133.3	138.6	139.3	139.6
Memphis, Tenn	103.7	103.6	102.8	108.5	116.8	116.9	117.6	122.8	124.8	126.5	126.4	126.4	126.1	126.1	127.7	137.2	138.1	138.1	138.0	138.0
Nashville, Tenn	97.0	96.4	95.1	103.2	107.9	111.2	114.0	118.3	120.4	121.5	121.4	121.4	121.4	.....	.....	.....	127.9	130.6	.....	.....
New Orleans, La	104.8	103.6	102.5	119.3	121.1	121.6	123.9	126.9	128.5	128.9	131.9	131.9	131.3	131.4	131.4	138.4	138.6	138.6	138.6	138.6
Philadelphia, Pa	105.8	107.4	110.0	112.4	118.0	117.5	120.2	134.0	140.7	139.5	139.3	139.0	138.8	146.2	145.8	148.4	148.7	150.2	149.9	150.1
Phoenix, Ariz	99.0	99.0	99.0	101.2	103.9	104.3	107.7	109.1	110.3	112.9	111.8	111.8	111.9	112.0	112.0	113.2	115.7	115.7	117.9	117.9
Pittsburgh, Pa	101.7	99.8	100.1	104.6	110.2	111.7	118.7	118.6	118.6	119.5	126.1	127.0	130.7	133.5	131.9	131.9	133.5	134.0	134.2	.....
Reno, Nev	105.0	105.5	105.5	108.6	109.0	109.2	110.6	117.2	116.1	117.5	118.2	119.9	119.2	120.6	120.7	119.9	124.6	127.5	127.5	127.5
San Antonio, Tex	96.4	94.8	94.5	100.7	113.4	113.6	115.5	131.4	132.6	127.6	127.4	128.5	128.5	128.5	.....	.....	137.8	137.6	.....	.....
San Diego, Calif	95.0	93.1	93.2	107.0	106.4	106.7	111.9	123.1	124.1	125.0	126.3	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif	102.4	102.1	101.5	103.1	103.3	105.4	112.3	114.3	118.9	121.6	121.6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wheeling, W. Va	104.3	104.6	105.1	107.6	106.0	109.0	109.7	114.3	116.4	122.7	122.7	122.0	122.1	122.1	122.1	122.9	129.7	129.7	.....	130.5
Wilmington, Del	97.0	94.2	93.9	106.5	108.4	111.5	115.9	122.8	131.3	130.1	130.1	130.1	129.6	129.6	130.4	131.2	133.8	134.6	135.3	135.3

	1940				1941				1942				1943				1944			
	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.	Mar.	June	Sept.	Dec.
Asheville, N. C	100.0	99.6	98.8	106.4	113.9	114.2	115.6	118.8	118.8	120.1	120.1	120.1	.....	.....	.....	133.4	134.1	134.1	133.0	138.1
Atlanta, Ga	97.4	96.5	100.0	107.2	111.5	113.9	117.4	119.0	120.4	122.7	122.7	125.1	130.1	130.1	134.8	137.7	140.1	142.5	143.5	146.1
Baltimore, Md	98.4	98.4	98.5	109.0	116.2	117.8	122.8	127.4	130.6	132.3	132.2	131.3	135.1	144.2	145.7	149.4	150.1	151.8	151.8	151.8
Birmingham, Ala	93.6	91.2	94.2	106.4	108.3	108.2	114.7	115.4	116.9	117.0	117.1	117.1	116.8	120.0	122.8	125.2	127.3	127.7	129.7	129.8
Boston, Mass	104.1	104.0	104.5	105.8	108.0	112.4	116.7	119.8	123.8	123.9	124.2	124.2	126.6	125.2	127.0	128.4	128.6	130.9	131.3	131.4
Chicago, Ill	99.8	99.6	99.3	99.2	99.5	100.3	103.9	104.8	107.1	107.1	109.3	109.3	109.0	109.4	110.2	111.2	112.2	111.9	111.9	112.2
Columbia, S. C	99.5	98.0	98.4	114.7	116.6	120.6	124.9	128.3	131.9	132.2	132.2	132.1	141.4	.....	.....	131.2	131.9	131.9	139.2	139.7
Cumberland, Md	102.3	.....	.....	105.9	110.1	109.1	113.8	114.2	114.1	120.5	122.1	122.1	123.9	126.8	126.8	.....	138.4	141.0	141.0	.....
Denver, Colo	98.9	96.8	96.8	100.6	103.3	103.5	109.2	110.6	111.7	111.5	112.7	112.1	112.1	112.1	115.1	116.5	117.0	119.3	119.7	119.9
Hartford, Conn	101.7	103.1	103.2	107.2	111.0	114.4	123.7	125.4	128.6	128.6	128.5	128.4	128.2	128.2	130.3	134.5	134.6	135.1	135.2	135.2
Manchester, N. H	98.1	98.1	98.1	99.3	99.6	101.5	103.7	105.0	108.0	108.4	108.7	108.7	114.1	114.3	115.4	116.2	118.1	118.3	120.4	120.6
Milwaukee, Wis	108.2	108.4	109.1	109.8	112.5	114.3	116.3	116.6	120.7	123.7	130.9	131.2	130.7	130.7	133.2	137.2	140.4	141.6	141.4	141.7
New Haven, Conn	103.6	103.9	103.9	108.4	111.4	117.8	126.3	127.0	129.0	130.9	131.1	131.1	130.5	130.0	132.5	135.9	138.3	140.6	144.1	.....
Oklahoma City, Okla	107.7	108.8	108.4	120.3	122.7	120.9	128.0	128.9	127.4	130.5	135.5	136.1	137.5	138.1	151.2	154.0	155.1	156.3	156.4	158.2
Omaha, Nebr	106.8	106.4	105.6	107.5	111.0	111.8	117.7	120.8	124.2	125.0	126.0	126.2	125.8	125.7	125.8	129.1	131.0	132.7	133.4	133.0
Oshkosh, Wis	102.5	101.1	101.4	108.6	111.6	112.6	120.1	122.2	125.1	125.2	133.6	133.6	133.6	133.6	133.6	133.6	133.6	133.6	133.6	.....
Peoria, Ill	108.9	109.8	110.2	110.9	112.6	113.0	119.1	119.4	119.8	119.8	119.8	119.7	119.7	124.1	124.1	125.6	125.6	125.6	125.5	.....
Portland, Me	98.9	98.9	99.2	101.6	104.7	106.3	109.6	110.8	116.3	119.1	122.3	126.4	129.6	134.5	140.6	144.4	146.3	147.8	151.0	151.1
Providence, R. I	104.6	105.2	106.9	109.7	111.5	111.8	116.1	118.1	119.8	120.7	120.7	120.7	124.0	128.7	132.3	135.6	136.2	138.6	139.7	141.4
Raleigh, N C	96.1	96.1	99.7	102.8	105.0	105.5	116.7	114.2	120.7	120.8	121.4	121.5	126.1	.....	.....	127.2	127.2	126.7	128.0	130.0
Richmond, Va	96.3	95.7	96.8	105.3	105.2	106.5	109.7	111.3	113.9	115.1	116.0	116.0	115.7	117.7	119.9	122.1	122.5	125.0	125.0	126.9
Roanoke, Va	105.7	105.8	.....	116.1	120.6	120.7	122.6	125.1	128.1	130.4	125.0	125.2	127.2	127.3	127.2	.....	136.6	137.6	137.6	.....
Rutland, Vt	96.9	97.0	98.8	99.1	107.1	107.7	115.0	115.8	120.3	121.7	124.4	124.4	124.5	125.2	125.4	126.0	126.8	127.0	129.1	.....
Springfield, Ill	104.8	106.0	106.3	110.0	110.7	110.7	116.3	116.9	116.1	116.1	116.6	117.1	117.7	123.0	123.5	123.7	123.7	123.7	123.5	.....
Tampa, Fla	103.9	102.8	103.6	109.2	111.5	111.4	112.0	112.8	113.8	114.0	119.4	.....	123.8	.....	.....	130.2	130.2	130.2	130.3	134.2
Washington, D. C	104.4	104.3	105.2	116.0	116.4	119.4	124.2	128.4	133.8	136.5	135.9	136.2	141.1	143.3	144.7	149.3	149.5	152.4	153.7	153.7
Wichita, Kan	103.3	104.7	104.8	107.6	109.0	114.7	117.3	118.8	123.5	123.6	124.3	127.5	127.5	129.0	129.1	132.3	133.6	134.8	135.0	135.2

"THAT'S SERVICE"

Another load of Meyer Steelforms on the job... ON TIME!

Mighty important too, to men who build on precision schedules and made possible by the CECO coast to coast warehousing service. Just one of the many important services rendered by CECO to you who build with reinforced concrete.

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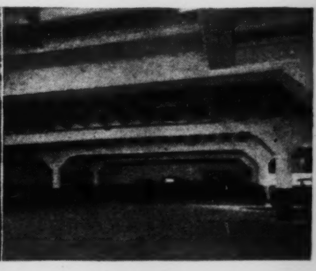

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OPA Price Regulations Affecting Construction

(As revised or amended since March 18, 1944, and supplementing digests published April 22, 1943 and April 20, 1944)

MPR No.	Items Covered	Date Effective	Purpose
6.	**Iron and Steel Products** (Amend. 10)	July 12, 1944	Adjustment of analysis extras on full grades of alloy steel; provides $2 per gross ton decrease on two grades; $3 increase on two other grades.
	(Amend. 11)	Jan. 11, 1945	Interim increases of $2–$5 per ton in ceilings for 5 basic products at mill; 1st industry-wide increase since 1939.
	(Amend. 12)	Mar. 1, 1945	Warehouses and jobbers authorized to pass interim increases in mill ceilings on 4 basis products on to their customers.
13.	**Douglas Fir Plywood** (2nd Revision) (Amend. 1)	July 24, 1944	Jobber and retailer mark-ups on ponderosa pine plywood restored to higher levels at which they had been fixed prior to May 11, 1944.
	(Amend. 3)	Dec. 4, 1944	To expedite filling military orders, producers who have submitted proposed prices to OPA for "specific" approval may quote such prices, make deliveries and under certain conditions receive payment, pending OPA approval.
	(Amend. 4)		Manufacturers of plastic-faced plywood containing 1 or more laminations of softwood veneer authorized to apply for special prices.
19.	**Southern Pine Lumber** (2nd Revision) (Amend. 3)	June 12, 1944	Direct mill shipments must be accompanied by tally card showing point of origin and describing lumber as to species, conditions, size, etc.
	(Amend. 2 to 19A)	July 18, 1944	Small sawmills customarily making special cuttings of railroad mat'l. crossarms and paving block may apply for special prices.
	(Amend. 4)	Sept. 19, 1944	Consolidation and simplification of several price tables; also regulation provisions dealing with direct mill distribution.
	(Amend. 3 to 19A)	Sept. 19, 1944	Transportation addition permitted over max. prices on log-run lumber in deliveries over 30 miles reduced from 10 to 5c. per mile.
	(Amend. 4)	Oct. 21, 1944	Restores 10c. per mile allowance permitted for transportation of log-run lumber beyond the 30-mi. "free delivery" zone.
	(Amend. 4)	Oct. 30, 1944	Sellers registered by OPA as new direct-mill distributors have additional 3 months to comply with requirement to deliver to Central Procurement Agency 1,000,000 ft. within 6 months.
	(Amend. 6)	Jan. 5, 1945	Charges for special loading of open-top rail car shipments of lumber to 4-in. thick established; also includes 2 pricing changes.
	(Amend. 7)	Jan. 27, 1945	Producers authorised to price all Southern pine (except finished grades) on basis of exact length shipped.
26.	**Douglas Fir Lumber** (Amend. 6)	April 6, 1944	Producers of molding (fir and West Coast lumber in Wash., Ore., Calif. (west of Cascade Mts.) must apply for ceiling prices.
	(Amend. 7)	April 18, 1944	Ceilings increased on boards up to 2-in. thick; reduced on planks and timbers.
	(Amend. 8)	July 3, 1944	Existing ceilings remain in effect till Sept. 16, 1944.
	(Amend. 9)	Aug. 14, 1944	Prices for various items not previously listed; also changes covering mill prices for fir and other West Coast lumber.
	(Amend. 10)	Sept. 8, 1944	Correction of 1x2-in. casing price and base.
	(Amend. 11)	Oct. 14, 1944	30-day extension of temporary price adjustment.
49.	**Resale of Iron and Steel Products** (Amend. 21)	April 8, 1944	Warehousemen and jobbers permitted to use lowest filed or published rail tariff rate of freight, plus 3% of such rate in computing delivered prices.
	(Amend. 22)	April 22, 1944	Changes in definition of warehousing of iron and steel products.
	(Amend. 23)	June 1, 1944	New max. prices for sales and resales of excess stocks.
	(Amend. 24)	June 1, 1944	Resellers exempted under certain conditions from provisions requiring special invoicing of excess stocks.
	(Amend. 25)	June 17, 1944	Simplified pricing method for delivered secondary products.
	(Amend. 26)	July 25, 1944	Changes to reflect industry prices and clarify existing provisions.
	(Amend. 28)	Feb. 15, 1945	Changes to modify provisions governing resale from supplementary warehouse facilities.
	(Amend. 29)	Mar. 1, 1945	Authorization to pass on to customers the (interim) increase in mill ceilings for 4 basic steel products.
82.	**Wire, Cable and Cable Accessories** (Amend. 8)	April 3, 1944	New dollars and cents price schedule for mfgrs. of armored electr. cable (BX), based on industry prices in effect in 1941.
	(Amend. 9)	May 29, 1944	Three types of cable omitted from or added to list of mfgrs. ceilings.
88.	**Petroleum and Petroleum Products** (Amend. 6)	April 29, 1944	Four changes in ceilings in specified areas for products affects Ohio, Md., Va., and N. J.
	(Amend. 14)	Aug. 14, 1944	Facilitates obtaining authority to raise prices where below state fair trade levels.
94.	**Western Pine Lumber** (Revision)	June 20, 1944	
	(Amend. 1)	Nov. 2, 1944	Increase of $1 per M ft., b.m. for resawing.
134.	**Construction and Road Equipment Rental** (Amend. 15)	April 29, 1944	Specific method for computing overtime labor costs for operating and maintenance services rendered in connection with equipment rental.
	(Amend. 1–17)	Feb. 1, 1945	Adjustments for relevant cost factors deemed to be of general applicability.
136.	**Machines and Parts, and Machinery Services** (Amend. 112)	Mar. 27, 1944	Sellers of industrial machines whose costs have risen due to suppliers' price being raised under automatic adjustment provisions may apply for permission to pass on increase.
	(Amend. 113)	April 17, 1944	Sales of used pressure vessels and atmospheric pressure vessels installed underground exempt from price controls.
	(Amend. 114)	April 15, 1944	Consolidated form containing inventory information needed by WPB, and sales reports for review by OPA.
	(Amend. 115)	April 18, 1944	Simple method for determining max. prices of modified machines which will be in line with those in effect on the base date.
	(Amend. 116)	May 8, 1944	Sales by mfgrs., whslers., and retailers of new house trailers and motorcycles made on and after Aug. 12, 1943 now covered by MPR-136.
	(Amend. 117)	June 14, 1944	Alternative pricing method for sales of used constr. equip. limited to tractors, shovels, draglines, cranes, and backhoes.
	(Amend. 119)	June 26, 1944	New method for pricing rebuilt fractional hp. electr. motor needed to run refrigerators, washing machines, etc.
	(Amend. 120)	July 1, 1944	Bearings and bushings made of ferrous and non-ferrous metals added to MPR-136.
	(Amend. 121)	July 3, 1944	OPA may establish max. price by written order where seller does not compute his max. price as required by regulation.
	(Amend. 123)	July 18, 1944	Provision requiring filing of inventory and sales report simplified.
	(Amend. 125)	Oct. 2, 1944	Inventory and sales report filing suspended for 90 days beginning Oct. 1, 1944.
206.	**Vitrified Clay Pipe and Allied Products** (Amend. 2)	April 26, 1944	Increases manufacturers' price in Eastern areas approximately 8%; jobbers and dealers allowed to pass on dollar increase.
	(Amend. 3)	July 5, 1944	Clarifies pricing and prices in one table
	(Amend. 4)	July 24, 1944	Increases prices by 11.4% (approx.) in 5 Middle Western states; jobbers and dealers allowed to pass on dollar increase.
	(Amend. 5)	Aug. 17, 1944	East Central area increase of about 8%; increase allowed to be passed on.
	(Amend. 6)	Sept. 14, 1944	Established specific prices in Ore. Zone 1.
	(Amend. 7)	Nov. 15, 1944	Re-enactment of provisions for pricing shipments out of normal marketing areas.
	(Amend. 8)	Nov. 16, 1944	Establishes prices for extra strength vitr. clay sewer pipe and fittings in West Central, South Central and Rocky Mtn. areas.
	(Amend. 9)	Nov. 18, 1944	Increases Southern prices by about 15%; allowed to be passed on.
	(Amend. 10)	Jan. 18, 1945	Establishes prices for one company.
216.	**Eastern Poles and Piling** (Amend. 3)	Mar. 31, 1944	Sellers with firm contracts may apply for permission to complete deliveries at contract prices for 60 days after effective date of price decreases.
	(3rd Revision)	Sept. 26, 1944	In regard to transfer of products other, than railroad ties to MPR 558, 559. 560.
	(Amend. 1)	Oct. 30, 1944	Changes and clarification of regulations.
219.	**Northeastern Softwood Lumber** (Amend. 1)	May 5, 1944	Softwood lumber imported from Russia brought under coverage of regulation.
223.	**Northern Hardwood Lumber** (Amend. 12)	May 30, 1944	Dollars and cents prices for No. 2 common grade hard maple lumber in 2½, 3 and 4-in. thickness.
224.	**Cement** (Amend. 6)	April 20, 1944	Price increase, Northeastern area, 20c. per bbl.; dealers allowed to pass on.
	(Amend. 7)	Aug. 30, 1944	Price increase in six East Central states 10c. per bbl.; can be passed on to users.
	(Amend. 8)	Oct. 14, 1944	20c. price increase Southern Calif. area.
	(Amend. 9)	Jan. 8, 1945	20c. price increase in nine mid-Western states, dealers allowed to pass on.
	(Amend. 10)	Feb. 12, 1945	Corrects certain county listings (Amendment 9).

OPA Price Regulations Affecting Construction

Items Covered	Date Effective	Purpose
o Lumber and work (Amend. 6)	May 23, 1944	Increases in prices for redwood.
(Amend. 7)	Oct. 23, 1944	Transfer of redwood shingles to coverage of western softwood shingles (MPR 164).
(Amend. 8)	Nov. 13, 1944	Direct mill sales of 10 M bm. or less brought under coverage of regulation.
ct Sales of ing Builders' ware (Amend.)	....	Provides for mark-ups on lump sum sales of builders hardware.
pruce Lumber (Revised) (Amend. 2)	Feb. 1, 1945	Loading by mills of mixed grades of shop, box common and select merchantable lumber without grade identification marks when shipment is made to millwork and box mfrs. authorized if inspection certificates issued by approved agencies is available
Millwork—Soft- Lumber Pro- (Amend. 4)	May 1 ,1944	Producers of flush veneered doors with hollow cores made of wood or insulating boards must submit proposed prices for approval.
t and Asphalt ucts (Amend. 8)	Feb. 12, 1945	Petitioners for increased prices may sell while petition is pending at prices that may be later established by official action on request.
Posts (Amend. 3)	May 29, 1944	Western fence posts covered in MPR 536.
Sulphate (Amend. 5)	Oct. 18, 1944	Monahydrated copper sulphate price raised.
(Amend. 6)	Dec. 16, 1944	Price increase of 25c. per cwt. on monahydrated copper sulphate produced in east (12½ lb. pkg.).
astern Hard- Lumber (Amend. 7)	April 20, 1944	Translation of an overall increase of 6% authorized Feb. 5, 1944.
oofing and Floor- Felts (Amend. 1)	July 24, 1944	Differentials in effect Mar. 1942 between widths may be adjusted for in ceilings.

MPR No.	Items Covered	Date Effective	Purpose
402.	Western Red Cedar Lumber (Amend. 1)	May 25, 1944	Pricing changes in regulation.
	(Amend. 2)	Feb. 10, 1945	Provides for adjustments in hardship cases or where production is impeded.
432.	Maple, Birch and Beech Flooring (Amend. 3)	April 27, 1944	Revising grade differentials and establishing differentials for certain lengths.
	(Amend. 4)	June 28, 1944	Application for adjustment on hardship grounds can be submitted until July 15.
	(Amend. 6)	Nov. 23, 1944	2% price increase except for producers in Southern, South Central and Appalachian regions.
460.	Western Timber (Amend. 2)	June 17, 1944	Permits timber sales on lineal ft. basis and simplifies reporting provisions.
466.	Asbestos-Cement Building Materials (Amend. 1)	....	Governs sales between producing and non-producing manufacturers.
	(Amend. 2)	....	Clarification for Keasbey-Mattison Co.
467.	Distribution Yard Sales of Hardwood Lumber (Amend. 3)	May 22, 1944	Heavier industrial sizes of yellow cypress brought within coverage.
	(Amend. 4)	Oct. 25, 1944	Yards may apply to lumber branch (OPA) for their max. prices on walnut lumber under individual pricing procedure.
491.	Pressure Preservative Treatment of Forest Products and Pressure Treated Forest Products (Amend. 1)	July 24, 1944	Minor price changes; corrections and changes of technical nature of regulation made.
	(Amend. 2)	Nov. 25, 1944	Flat additions to max. prices that pressure treating plants may make in sales of treated poles and piling.
536.	Western Fence Posts (Amend. 1)	Sept. 13, 1944	Increase of producers prices on sales to truckers and recognizing trucker as distributor, giving him 15% markup over producers' price.
555.	Western Poles and Piling (Amend. 1)	Oct. 23, 1944	Correction of regulations.
	(Amend. 2)	Dec. 19, 1944	Revision of prices and estimated weights

Cost Summary of Temporary War-Housing Projects

OLLOWING table shows total development costs and costs per dwelling unit by major cost classifica- r typical war-housing projects put under contract Federal Public Housing Authority during the year December 31, 1944. All projects in the table are dwellings of temporary construction and the data osts at the time of contract award. Variations in project composition, such as the size of families to be accommodated, the type of utilities and equipment installed, the amount of furniture and furnishings provided, if any, and the number of commercial and other project facilities provided, affect the comparability of the individual project costs that are reported in the tabulation below:

			Average Cost per Dwelling Unit					
ocation of Project	No. of Dwelling Units	Total Development Cost [1]	Total Development	Dwelling Facilities [2]	Non-Dwelling Facilities [3]	Site Improvement [4]	Site Acquisition [5]	Architect, Admin. and Other [6]
low	100	$312,800	$3,128	$2,234*	$144	$582	$35	$133
field	100	272,400	2,724	1,942	16	635	15	116
no	100	283,500	2,835	1,936*	114	512	163	110
Angeles	1,000	2,120,100	2,120	1,530*	97	411	16	66
Angeles	1,000	2,499,800	2,500	1,958*	62	397	31	52
rd	500	1,013,000	2,026	1,432*	105	425	14	50
Francisco	224	590,600	2,637	2,008*	16	367	136	110
Francisco	520	1,333,200	2,563	1,905*	124	355	96	83
Francisco	256	568,800	2,222	1,711*	....	359	46	106
Francisco	260	717,600	2,760	1,917*	100	564	71	108
n Park	100	265,500	2,655	1,979	132	413	29	102
mi	200	511,100	2,556	1,878*	101	466	6	105
ama City	140	358,700	2,562	2,063*	16	401	2	80
ama City	120	318,000	2,650	2,058*	118	391	1	82
acola	100	269,900	2,699	1,986	132	364	71	146
ring	80	204,700	2,559	2,049	21	379	2	108
con	500	1,201,100	2,402	1,652	67	623	13	47
ietta	500	1,155,500	2,311	1,726	9	508	3	65
dwell	60	181,000	3,018	2,243*	227	385	3	160
roit	124	427,900	3,451	2,469	23	794	38	127
exico								
n	80	173,100	2,164	1,548	11	444	21	140
vis	100	237,300	2,373	1,947*	91	201	15	119
math Falls	40	128,700	3,218	2,343	185	505	10	175
rlingen	200	549,300	2,747	2,200*	87	300	67	93
ndo	50	106,800	2,136	1,608	30	338	..	160
os	120	311,000	2,591	2,003*	62	399	4	123
mple	25	76,000	3,040	1,908	48	640	244	200

OTES:

nded to nearest hundred dollars; excludes allowances for contingencies. f dwelling structures including plumbing, heating and electrical costs, e and furnishings (where indicated by an*), and movable equipment ranges, refrigerators and portable space heaters. [3] Cost of manage- nd maintenance and other non-dwelling buildings, spaces and equipment.

[4] Cost of clearing and general grading, streets and walks, utility mains, including sewers, water, gas and electrical systems, landscaping and other costs of developing the site. [5] Cost of land and land acquisition expense. [6] Includes amounts for architectural and engineering services, costs of inspection and supervision on project site, administrative costs of local housing authority directly traceable to the project (when developed by a local public housing authority).

South American Building Costs

Arthur J. Boase

Manager, Structural Bureau, Portland Cement Association, on leave as
Special Editorial Representative, Engineering News-Record

THE FACT that reinforced concrete is an economical type of construction in South American countries does not mean that it is cheap. Material costs are very high, as indicated in Table 1. Although these figures are necessarily approximate, in general, they are as good as a designing engineer in South America will have at his disposal since they were obtained directly from contractors and checked against office figures of designing engineers. They are indicative.

One is greatly impressed by the figure of 8 to 10¢ per lb. for reinforsing steel, but the full effect of this high price is not brought home until one visits the various jobs under construction.

The cost of form lumber is likewise a great surprise, and again reflects scarcity. In spite of this, contractors in Sao Paulo, because of city ordinance, are required to encase entire buildings with boards during the period of construction. Some contractors tell you they do not object since the sale of space for advertising in the way of posters about pays erection costs. On state buildings, however, advertising is prohibited. In a country that claims it is "poor", it is hard to justify such practice.

Construction labor costs

Table 2 gives figures on the cost of labor in the larger cities of the three countries visited. These prices are necessarily approximate. For instance, the figure of 80¢ per 8-hr. day in Rio, varies considerably, and may not apply at all in other Brazilian cities. Labor cost in Belem, a fairly sizeable city on the northern coast of Brazil, was checked and it was found to be 45 rather than 80 cents. Again the figure for foremen might be $50 rather than $75. Nevertheless it is believed that the table is accurate enough for estimating purposes. These costs are rising, but not so rapidly as are those of building materials.

Appreciating that the question "How much does a cubic yard of concrete cost in a building frame" is in the same category as the question "How high is up", figures obtained from several contractors in Brazil check very closely at about $40 per cubic yard. Of this $40, $8 or 20 percent represents labor and $32 or 80 percent represents the cost of materials. Compare this with American costs of about $25, and a 50-50 distribution. The reason for using thin members in South America becomes apparent.

Factors in concrete cost

From the cost of $8 labor for a cubic yard of concrete, and the price of common and skilled labor from Table 2, one deduces that it takes an unbelievably large number of hours to produce a yard of concrete. However, care was taken to check these figures, not only in Rio, but with contractors at Sao Paulo, and a remarkably close agreement was obtained.

No time studies were made, but you do not need them to know that
struction moves slower than in
United States, and certainly
laborers are required. A very goo
lustration of this is afforded
relatively common method of
ing brick from floor to floor.
man picks a single brick from
stock pile and places it on a
wooden paddle with a long ha
held by another workman. The l
then executes a motion similar
pitching hay, which throws the b
to a third laborer on the floor ab
This laborer in turn gives it t
fourth laborer who places it o
stock pile. You ask if that is
economical method and are told
"men are cheap". Your respect
the hod carrier method is raised
little. It is very possible that bec
of the cheapness of labor careless
creeps into its handling.

This is an excerpt from the art
by Mr. Boase, "South Ameri
Building is Challenging" publis
in Engineering News-Record, Oct.
1944, (vol. p. 499), in which he
ported on building design, constr
tion practices, code provisions,
material and labor costs.

TABLE 1—BUILDING MATERIALS COSTS IN SOUTH AMERICA

	Rio de Janeiro Brazil	Buenos Aires Argentina	Montevideo Uruguay
Cement	85¢—94 lb. bag	75¢—110 lb. bag	$1.00—110 lb.
Sand	$2.40 cu. yd.	$2.25 cu. yd.	$2.00 cu. yd.
Crushed rock	$2.40 cu. yd.	$2.80 cu. yd.	$3.80 cu. yd.
Reinforcing steel	9¢ lb.	10¢ lb.	8¢ lb.
Form lumber (mostly Yellow Pine)	10¢ bd. ft.	15¢ bd. ft.	16¢ bd. ft.
Clay tile 8x12x4	$40 per 1000	$40 per 1000	$17 per 1000
Concrete block 8x8x4	$30 per 1000	Not much used	Not much used

TABLE 2—CONSTRUCTION LABOR COSTS IN SOUTH AMERICA

	Rio de Janeiro Brazil	Buenos Aires Argentina	Montevideo Uruguay
Common Labor	80¢—8-hr. day	$1.60—8-hr. day	$1.60—8-hr. day
Carpenters	$1.45—8-hr. day	$2.50—8-hr. day	$2.00—8-hr. day
Steel Setters	$20 per ton	$2.50 per day	$2.00 per day
Foremen	Up to $75 per month	$75 per month	$2.25—8-hr. day
Finishers	$1.25—8-hr. day	$2.50—8-hr. day	$2.00—8-hr. day
Bricklayers	$1.25—8-hr. day	$2.50—8-hr. day	$2.00—8-hr. day

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Time-and-Methods Study Speeds Construction

Homer George
General Cost Engineer, Tennessee Valley Authority

***Contents in Brief**—Formal methods study for heavy construction, developed by the Tennessee Valley Authority, has reduced substantially the time requirements of machines and labor and saved many times the cost of the study. Investigations have dealt with methods of construction and of equipment operation rather than with individual motion as in most factory time studies. Unit costs of many operations, developed from the time study, are given.*

EFFICIENCY of manual and machine operation on heavy construction may be increased substantially by studies similar to the time and motion studies of manufacturing operations. This has been proven by the experience of the Tennessee Valley Authority where "methods" study has had successful use for the past few years.

The primary purpose of such studies has been to reduce costs by the development of methods that insure the most economical use of labor and equipment. This is in contrast to industrial studies, which deal basically with the output of individuals. In the construction field, studies are directed principally to methods and equipment operations; frequently they disclose uneconomical routines, avoidable delays and use of skilled labor on work that might be done as well with common labor.

A few examples will indicate the nature and value of the time and methods studies on TVA construction. (Costs shown are those developed during the studies and are not necessarily complete or final costs.)

At one of the projects, the cost of placing rolled fill was much higher than anticipated. The time-study crew was instructed to study the operation, loading, hauling, spreading and compacting, in detail. The study continued through 84 shifts, during which time 107,840 cu.yd. of material were placed.

Written reports were made to the job superintendent immediately after each shift, showing direct cost for labor and machine time for both hauling and rolling operations, quantity placed, length of haul, a record of delays and the reasons for them. Suggestions for reducing operating time and costs were freely offered usually adopted. The average cost for the first 20 shifts was $0. per cu. yd. and for the remaining shifts $0.258, a saving of abou third. If the unit cost of the 86,0 cu. yd. placed during the last 64 shi had been as high as the unit cost the first 20 shifts, the total cost the embankment would have be more than $7,700 higher *for just time that the time study was in pro ress.*

Several studies were made of mix plant operation for the purpose eliminating delays and increasing p duction. One such study, conduct at Cherokee Dam in cooperation wi the concrete technician, resulted an increased plant efficiency of percent. This was accomplished by i creasing the mixer charge 10 percen shortening the mixing cycle 9 se and reducing delays from 10 percen of gross operating time to 3.2 percen Study on only 28 shifts were require to make this substantial improvemen Another study of mixer plant oper tion revealed that 16.6 sec. were re quired to batch cement; an existin condition was corrected, reducing th

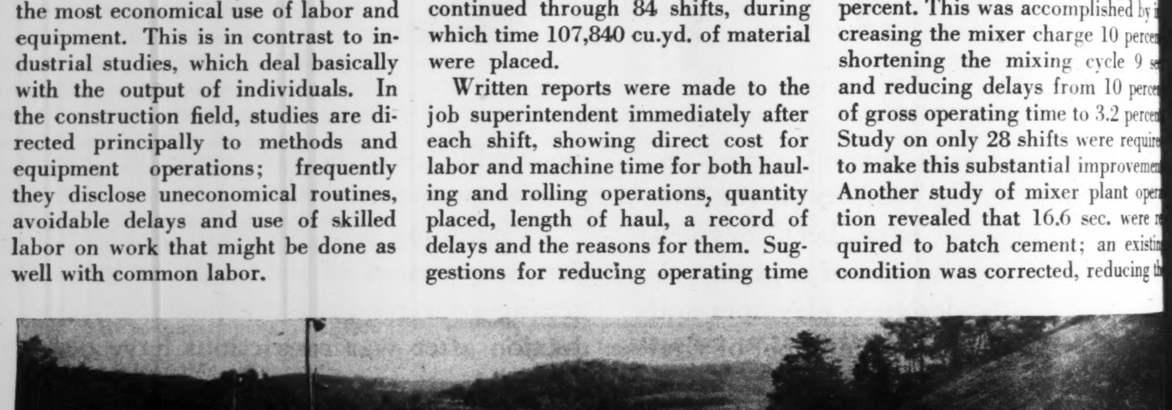


Fig. 1. *Time-and-methods studies on Tennessee Valley Authority projects showed that one type of earth handling machine was more economical than another for the particular application.*

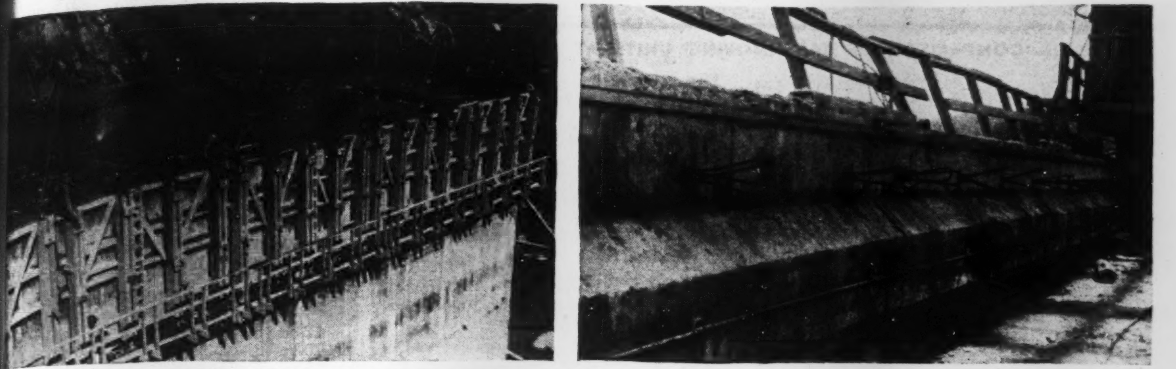


Fig. 3. Partly as a result of time-and-methods study the cantilever form and raising by A-frames were adopted on TVA projects to increase the speed of concrete placing by eliminating interior ties.

batching time to 12 sec. A study of riprap placing revealed inefficient handling of waste material at the quarry, and a study of brick laying revealed that a substantial reduction could be made in the number of tenders distributing materials.

Studies influence purchases

An important application of time and method study data is in selection and purchase of equipment and for allocation to specific jobs. For instance, the purchase of several 18-cu. yd. scraper units was under consideration at the Chickamauga project. Some information was available on the performance of 12-cu.yd. carrying scrapers owned by TVA, but no definite data was available on the 18-cu. yd. unit.

Tests were conducted to determine the relative efficiency of an 18-cu.yd. carrying scraper, two 12-cu.yd. scrapers hitched in tandem and a single 12-cu.yd. scraper, all operating on the same work. Each unit was powered with a single RD-8 tractor in comparable working condition. Results of the tests, on a 1,110-ft. average haul, are shown in Table I and indicate definitely that the two 12-cu.yd. scraper units in tandem were the most economical and efficient of those tested for the conditions existing at the project. Average production of the tandem 12-cu.yd. units were 13.8 cu.yd. more per hour than that of the 18-cu.yd. unit and 30 cu. yd. per hour more than the single 12-cu.yd. unit.

Under different conditions at Watts Bar Dam entirely different results were obtained. Length of haul was 2,000 ft. with loading done on a minus 5-percent grade and travel about 300 ft. on a minus 8-percent grade followed by 250 ft. of minus 2-percent grade, then changing to a plus 2-percent grade for 700 ft. and up a 4-percent grade for the remainder of the distance. The study was conducted over fourteen 8-hr. shifts, during which 26,000 cu.yd. of earth was moved by 5-units—two 23-cu.yd. carrying scrapers, each drawn by a 2-wheel tractor; two units of two 12-cu.yd. scrapers in tandem, each drawn by a crawler tractor; and one 12-cu.yd. single unit, also crawler tractor drawn.

The average production per shift was 1,841 cu.yd. and the maximum 24-hr. production was 6,846 cu.yd. A crawler tractor scarified the borrow pit and assisted the 23-yd. scraper units in loading. Results of the study proved that the 23-cu. yd. capacity scraper units were the most efficient and economical under the conditions existing on the work observed. Production and costs are shown in Table II.

At Cherokee Dam, where 1,500,000 cu.yd. of rolled earthfill was placed, the cost of moving earth by six-wheel tractor-truck combinations loaded by an elevating grader was compared to that for hauling by self-loading carrying scrapers. Studies were made and several changes suggested and instituted. A restudy at a later date showed that these changes and other improvements instituted by the job forces resulted in a hypothetical saving of $24,000 at a cost, for the study, of $1,650 or 7 percent of the saving.

Use of the loading and truck combination with the scrapers was of particular advantage to this job, due to the topography of the borrow pits, the elevating grader being used to the best advantage on comparatively level ground, while the scraper units leveled high spots and took advantage of downhill loading. The material handled was a dense chert-bearing clay.

The use of a push tractor to assist the scraper units in loading was found to be economical. At the beginning of the study both push and snatch tractors were used, but the use of the snatch tractor was discon-

TABLE I—PRODUCTION OF CARRYING SCRAPERS (1,140-FT. HAUL) AT CHICKAMAUGA DAM

	Cu.yd. per net operating hour	Equipment cost per cu.yd.
12-cu.yd. scraper — single	57.7	0.234
18-cu.yd. scraper — single	73.6	0.246
Two 12-cu.yd. scrapers — tandem	87.4	0.140
Average all machines	73.1	0.199

TABLE II—PRODUCTION OF CARRYING SCRAPERS (2,000-FT. HAUL) AT WATTS BAR DAM

	Production on fourteen 8-hr. shifts	Cu.yd. per net operating hour per unit	Equipment cost per cu. yd.
Two units 23-cu.yd. scrapers — single (wheel-tractor drawn)	14,292	98	0.126
Two units of two 12-cu.yd. scrapers — tandem	9,104	53	0.165
One 12-cu.yd. scraper — single	2,384	24	0.263

TABLE III—COMPARISON OF EARTHMOVING UNITS AT CHEROKEE DAM

	Elev. grader & tractor-truck combinations	Scraper units	Total
Production	238,270 c.y.	140,370 c.y.	378,640 c.y.
Loads per net oper. hr	4.2 loads	4.6 loads	....
Cu.yds. per net oper. hr	41.8 c.y.	77.6 c.y.	....
Loading and hauling (time-study costs)	16.7 cents	21.0 cents	18.3 cents
Spreading and compacting (time-study costs)	....	....	5.8 cents

Delays in Equipment Operation

	Elev. grader & tractor — hr.	Tractor-truck combinations — hr.	Scraper unit — hrs.
Rain	22.0	160.0	44.8
Wait for hauling units	47.9	....	......
Mechanical repairs	148.8	235.5	413.0
Miscellaneous	51.5	105.3	43.8
Grader repairs	....	763.6	....
Servicing	2.8	26.7	42.7
Wait on fill	....	171.7	38.7
Wait to be loaded	....	485.2	....
Total delays	273.0	1,948.0	583.0
Total working hours	1,200.0	7,650.0	2,392.0

tinued due to the downhill loading. Two push tractors were required to load the five scraper units operating on a 4,000-ft. haul. The average loading time for the scraper units was 2 min. while traveling 200 ft. on a 5-percent down grade in unscarified material. The average length of haul one way was 3,850 ft. and the average speed was 7.1 mph.

The elevating grader loaded 16½-cu. yd. of loose material in an average time of 1½ min. while traveling 405 ft. at a speed of 2.8 mph. The average length of haul for the six-wheel tractor-truck combinations was 5,060 ft. and the traveling speed was 7.7 mph. An average of 6.7-hauling units were required for each elevating grader for the 5,060-ft. haul. Data on production and delays with this equipment is shown in Table III.

A comparison of pertinent information developed in the time and methods studies of earth moving operations at the Chickamauga, Watts Bar, and Cherokee projects is presented in Table IV.

Data on rock haul

A study of loading and hauling operations in connection with rock fill also was conducted at Cherokee Dam. This study covered fifty 7½-hr. shifts during which weather conditions were favorable, showers occurring on three shifts and heavy rains on two shifts. Roads from quarry to fill were well maintained and truck speeds averaged 9.5 mph. loaded and 13 mph. empty. Average length of haul was 1.7 miles one way. A small truck repair shop was placed in service near the quarry and all minor repairs were made in this shop, thus reducing time lost for repairs to a minimum.

Loading equipment consisted of two 3-cu.yd. electric shovels and one 2-cu.yd. diesel shovel. TVA-owned trucks had a capacity of 12, 10 and 8 cu.yd. Trucks of 12- and 6-cu.yd. capacity were rented, prior to the delivery of trucks purchased by the Authority.

The following load factors (cubic yards of completed fill) used during the study were based on information obtained by weighing carefully measured loads on loadometer scales:

12-cu.yd. trucks	11 cu.yd.
10-cu.yd. trucks	10 cu.yd.
8-cu.yd. trucks	8 cu.yd.
6-cu.yd. trucks	4 cu.yd.

Quantities based on these load factors were 1.8 percent greater than the engineers' quantities computed from cross sections of the fill. Trucks were loaded to capacity to obtain the best production possible on the 3.4-mile round-trip haul.

Recommendations made by the study group for improving equipment performance and improvements made by the job forces at the Cherokee Quarry resulted in a hypothetical saving of about $22,000 in five months, based on the average reduction in loading and hauling costs obtained during that period. The approximate cost of the study was $755 or 3.4 percent of the savings. Unit production and costs are shown in Table V.

Relatively new to construction

Apparently, time studies have not been used to any great extent in the heavy construction industry. Spot checks and some short studies have been made by cost engineers, but no record is available of a construction force, prior to TVA work, that included a time-study unit as a definite

TABLE IV—PRODUCTION OF EARTH MOVING UNITS ON TVA DAM PROJECTS FROM TIME-AND-METHODS STUDY DATA

	Elev. grader & tractor truck comb.	23-cu.yd. scraper wheel tractor drawn		18-cu.yd. scraper unit,	Two 12-cu.yd. scrapers, tandem—one tractor		Single 12-cu.yd. scraper units	
	Cherokee	Watts Bar	Cherokee	† Chick.	† Chick.	Watts Bar	†Chick.	Watts Bar
Length of haul (ft.)	5,060 ft.	2,000 ft.	3,850 ft.	1,140 ft.	1,140 ft.	2,000 ft.	1,140 ft.	2,000 ft.
Total working hours	7,650.00 hr.	224.00 hr.	2,392.00 hr.	343.00 hr.	336.00 hr.	195.75 hr.	343.00 hr.	117.50 hr.
Rain — hours	160.00 hr.	....	44.80 hr.	35.25 hr.	36.25 hr.	....	32.50 hr.	....
Gross operating hours	7,490.00 hr.	224.00 hr.	2,347.20 hr.	307.75 hr.	299.75 hr.	195.75 hr.	310.50 hr.	117.50 hr.
Delays for repairs — hr.	999.10 hr.	57.17 hr.	413.00 hr.	45.63 hr.	30.40 hr.	15.86 hr.	11.92 hr.	5.08 hr.
Other delays — hr.	788.90 hr.	20.96 hr.	125.20 hr.	8.33 hr.	4.33 hr.	8.10 hr.	46.15 hr.	14.25 hr.
Net operating hours	5,702.00	145.87	1,809.00	253.79	265.02	171.79	252.43	98.17
Delays for repairs — percent of gross hours	*13.30	25.50	17.60	14.80	10.10	8.10	3.80	4.30
Cubic yards per gross hr	31.8	63.8	59.8	60.7	77.3	46.5	46.9	20.3
Cubic yards per net hr	41.8	98.0	77.6	73.6	87.4	53.0	57.7	24.3
Cost to load & haul—cu.yd. per station (100 ft.)	0.0033	0.0055	0.0055	0.0155	0.0062	0.0072	0.0145	0.0114

* Includes 10.2 percent delays caused by elevating grader repairs. † Chickamauga.

TABLE V—SHOVEL AND TRUCK PRODUCTION AT CHEROKEE QUARRY.

Shovels loading rock at quarry	No. 1—3 cu.yd.	No. 2—3 cu.yd.	No. 3—2 cu.yd
Net operating hours	226	190	36
Delays — hours	44	49	9
Gross — hours	270	239	45
Total Yardage (cu.yd.)	32,940	27,963	3,240
Cu.yd. per net hour	146	147	90
Cu.yd. per gross hour	122	117	72
Loading cost per cubic yard (¢)	.107	.111	.111

Trucks hauling rock 1.7 mile from quarry to embankment

	TVA Trucks			Rented Trucks	
	12 cu.yd.	8 cu.yd.	10 cu.yd.	12 cu.yd.	6 cu.yd.
Net operating hours	1,406	95	780	120	73
Delay — hours	564	44	402	67	7
Gross — hours	1,970	139	1,182	187	80
Cu.yd. hauled	39,369	2,056	18,910	3,300	508
Cu.yd. per load	11	8	10	11	4
Cu.yd. per net oper.hr	28	21	24	27	7
Cu.yd. per gro.oper.hr	20	15	16	18	6
Cost per cu.yd. (¢)	18.8	21.3	19.1	31.1	63.4

part of the organization. Supervisors have been inclined to hold to the theory that the foreman in charge of the operation is capable, or should be capable, of analyzing his own problems and determining the necessary remedies. This undoubtedly is true of many individuals, but experienced, full-time observers, who have the confidence of the foremen can render valuable assistance on any project.

Repetitive operations

The possible value of time-and-methods studies on construction is immediately apparent when one considers the truly repetitive mass operations involved in erection of hundreds of thousands of square feet of forms, the placing of hundreds of thousands of cubic yards of concrete or the handling and placing of millions of cubic yards of earth or rock fill. Plant and equipment for major projects may cost several million dollars and some individual machines more than a hundred thousand dollars. Here time, motion and methods study is most essential to realize the maximum use of equipment.

Since there can be no established pattern of operation to be followed under the varied conditions encountered on construction it is essential that information and suggestions for improvements be made in the early stages of the work to insure efficient use of men and material.

Study organization and procedure

The first investigations made by TVA generally were based on the methods followed in factory time-motion studies where a stop watch was the prime requisite. Experience showed that accurate timing of individual actions on widely diversified operations was not as effective as concentrating on improvement of general method and elimination of wasteful effort. However, some timing is essential to provide factual data on which to base definite recommendations.

For three-shift operation, TVA has found a four-man study group desirable—a supervisor who plans and directs the studies, records data and prepares reports while the other three serve as observers. Conferences with the superintendent and job supervisors are held periodically and the progress of the study, findings and recommendations of the study group are freely discussed. Upon completion of the field observations a detailed formal report is prepared describing the conduct of the study, the findings and recommendations of the group and tabulations of all costs and other pertinent data.

Experience, personality and ethics

Much depends on the experience and personality of the men selected for time-and-method study work. It is not necessary that they be graduate engineers, but they should be capable to recognizing design problems, reading blueprints, computing quantities and understanding the details of construction timekeeping and accounting procedure. Long construction experience is not essential, but the wider the experience the better qualified the man will be. One of the best men on TVA time study had several years experience as a foreman and as an engineer on construction.

Personality probably is more important than experience for study crew men. Experience comes quickly to a time-study man with the right personality. He must not be superior or "upstage;" he should know when to listen and when to talk; and he should realize that no matter how many days or years he spends on a job there is still something to learn. A good-time-and-methods study man will respect the ability of the foreman and the skill of the workmen, and will earn their respect and cooperation.

On all TVA time-and-methods studies the foremen, workmen and equipment operators are informed of the projected studies and the objective. Their cooperation and suggestions are actively encouraged both by management and by the study group prior to and during the study. If it can be arranged, it is desirable to have the foremen keep some records prior to the time study that can be used for comparison later.

When starting a specific study, preliminary operations are observed during two or three shifts to become acquainted with the various crews and to become familiar with the work under way. The purpose of the study is outlined to the workmen and it is carefully explained that no extra effort on their part is necessary and that the individual's job is not jeopardized.

Local conditions determine procedure

Studies conducted on the various TVA projects usually were undertaken to assist in developing the most efficient and economical methods of construction and operation, with available plant and equipment and under existing conditions. The problems faced were problems of the moment with controlling factors dictated by conditions peculiar to the operation studied.

For example, at Fontana Dam the study group has worked on methods study, really "bottleneck breaking", almost to the exclusion of time study.

A recommended change in the rou-

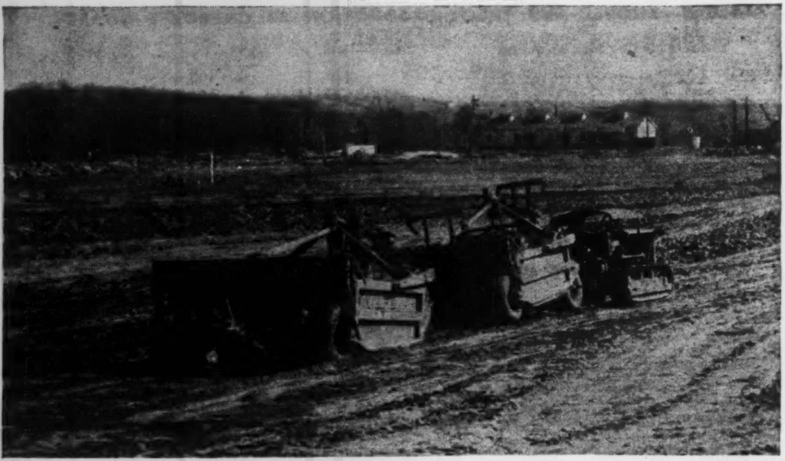


Fig. 4. Carrying scrapers in tandem behind a single tractor were found the most economical hauling unit on one project.

tine operation of concrete-carrying trains operating off the construction trestle increased the rate of concrete placing and permitted the permanent removal of the center track on the trestle (*ENR*, Nov. 30, 1944 vol. p. 689). This eliminated frequent stoppage of concrete transportation to permit use of the crane to remove single sections of the center track when it was necessary to lower the concrete buckets through the trestle to place concrete immediately below.

A bottleneck on aggregate, and hence concrete production, was secondary blasting in the quarry at Fontana as labor was not available to keep pace with the rest of the work by the customary block-holing method of drilling and shooting. The study group found that "dobying" could be done at about the same total cost with fewer men; they observed the use of 40-percent amonium gelatin and 60-percent high-velocity gelatin dynamite but found no perceptible advantage in the latter; they did, however, find that dynamite in a 5x12-in. cartridge was more rapid and convenient than conventional small sticks for dobying and required less dynamite. By devising a method for accurately determining depth of well-drill holes for primary blasting, the usual over and under drilling was reduced. Also, keeping and posting a record of footage obtained by each crew developed a competitive spirit and decreased the cost.

The widely diversified construction operations of the Tennessee Valley Authority have presented an unusual and ideal opportunity for the development of time-and-methods study on construction.

Study groups have been active on TVA projects almost continuously for ten years since starting at Norris Dam in November 1934. Studies were conducted at nine of the Authority's projects with the most extensive studies at Chickamauga, Watts Bar and Cherokee projects. The original Norris time-study group remained practically intact for the first six years of operation.

During the early studies antagonism on the part of some of the workmen was noted. As time passed and they came to understand that the time-study men were there to assist them in obtaining greater production by proper use of tools and equipment, rather than to critize the action of the individual worker, this antagonism disappeared.

Interest and cooperation on the part of job officials is the prime requisite for the success of time-study work. However, a time-study unit is useless to the superintendent or foreman who considers a suggestion a criticism. Such a study group is prepared and equipped, has the time and it is their job to make detailed studies of the operation at hand. The average foreman may not have had the experience, or the time, and what is fully as important, the contacts with the time office and the cost engineer's office required to produce factual reports. Effective use of such information, however, is up to the construction supervisors.

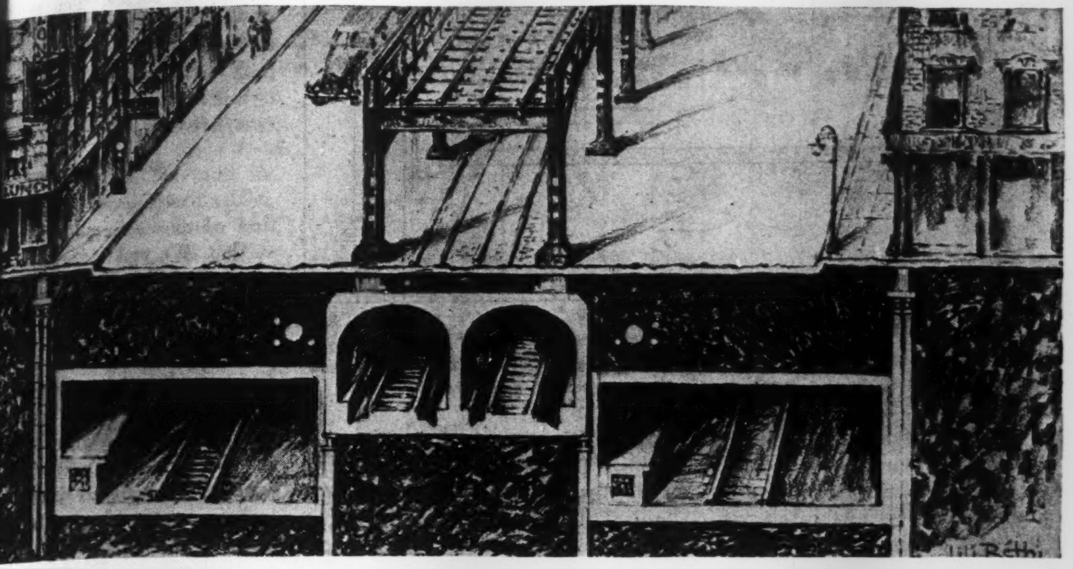
As might occur in any large organization, there is some difference of opinion among TVA job officials as to the value of such studies. Those who have worked with the study group and made real use of its services are convinced that the study unit is an essential part of a construction organization and that the studies present factual data that can be secured in no other way.

It was found that work was accomplished more quickly when under observation. Foremen and workmen, as a rule, became more cost conscious and offered valuable suggestions to the observers and evidenced a keen interest in improved production as the studies progressed. Operators of all classes of equipment usually were keenly conscious of the possibilities and the limitations of their machines. A spirit of rivalry developed between operators and between shifts, all of the workmen displaying a constructive interest in production attained each day. Fortunately, after the formal time study ended most of the rivalry and cost consciousness continued. One incentive, of course, was established records to be met or bettered.

It is impossible to state the cost of conducting time studies on the various TVA projects or that the operations of the study group were responsible for saving the Authority a certain amount of money. However, it is believed that the studies have been extremely beneficial and that substantial, though intangible, savings have resulted. Where it has been possible to compare cost of time study with its value on specified projects, the cost has been about five percent of the hypothetical savings.

Material prepared by F. C. Wardwell, project accountant at Chickamauga Dam, and by Homer J. Creel, head of the study group at Cherokee Dam, has been useful as source material in preparation of this article. Valuable assistance in preparation of this article was rendered by R. H. Burdick, Jr., a member of TVA's study group for three years.

Construction of TVA projects is under direction of C. E. Blee, chief engineer, and under supervision of A. L. Pauls, chief construction engineer. Time study activities were under the supervision of the various TVA project heads. The Construction Plant Division, headed by R. T. Colburn, cooperated in several studies of equipment performance.



fficult underpinning jobs, such as New York's Sixth Avenue subway, are a specialty of Spencer, White & Prentis.

Estimating and Bidding for Profit

Edmund A. Prentis, Jr.,
Chief Engineer, Spencer, White & Prentis, Inc., New York, N. Y.

ts in Brief.*—Mr. Prentis tells the rules that have guided his firm a quarter of a century of successful contracting—they are: Visit the ke a quantity survey, make two independent estimates, include items te and all general costs, disregard your competitors possible bids and ufficient mark-up to cover contingencies and profit.*

f the construction in the imme- postwar years will be let as m or unit-price contracts, upon complete and carefully d plans and specifications. ition will be keen for such ts, and estimating must neces- be done thoughtfully to secure t a price that will provide a return.

nating and the preparation of ill be entirely different from as sufficed for the negotiated e type of contract under which eat construction program re- for conversion to war work ccomplished. Such estimates sed for budgetary purposes and ng fees, so that approximations cost were sufficient. These ap- nate estimates were, and had to sed on roughly computed quantities and meager sub-surface information, the prices being those of previous similar work, or based upon the quick judgment of the estimator. Of course, the results, that is the relation between the actual and the estimated cost, often were extremely erratic. If costs over-ran or under-ran, however, no one was greatly injured because the work was done to the best of everyone's ability and a great deal of time was gained.

The fixed-fee form of contract not only complied with the law, which forbade cost-plus-percentage contracts, but was decidedly in the public interest. Design, planning and construction could go hand in hand and the work could be organized and carried out in the minimum of time. Actually, the seemingly impossible was achieved in every form of construction, and the breaking of records has been the rule rather than the exception.

But if the construction industry is to achieve expansion to the unprecedentedly high volume of work and employment that is assigned to it by planners, many who have had little experience in estimating and bidding on a competitive basis will enter the construction field. So perhaps it may be timely for one of the older men, such as myself, to review for the benefit of the newcomers the estimating methods used successfully by his company. The firm of Spencer, White & Prentis has confined its efforts almost exclusively to heavy engineering work, and it is to that kind of construction that these remarks primarily refer.

No site unseen

One invariable rule we follow is never to bid a job without first visiting the site and carefully studying the existing conditions. If it is true in the game of bridge that "a peek is as good as two finesses," it is equally

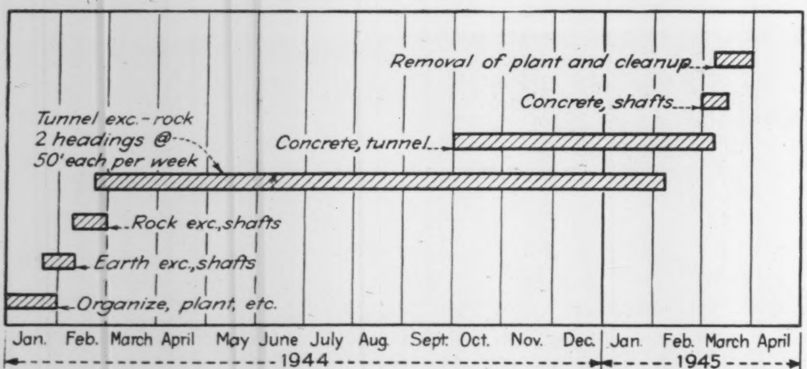


Fig. 2. Skeleton time schedule made up for bidding. If the job is secured a detailed progress schedule is made to check progress of each item.

true in contracting that a peek at the site is better than two guesses. Usually, prevailing wages and working conditions, access to the job and even material prices can best be ascertained at the site.

Another rule of ours rarely broken, and never on work of large magnitude, is to prepare independent estimates by dividing the staff into two groups. Before working separately on the estimate, however, a careful study of the plans and specifications is made, in which engineering problems are fully discussed and the pattern for the estimate is agreed upon. This pattern is generally familiar to our organization and is kept uniform by use of forms, such as the shown, which are varied only tail to fit the particular job. both estimates follow the sam tern is important when they are compared.

Quantity survey

The first operation in the pr tion of any estimate is the qu survey. We make it a practice t mate all quantities carefully fro plans, specifications, and ava sub-surface information, even in price contracts where quantitie furnished by the contracting a ity. Most unit price contracts that the quantities given are not anteed, and we have found cases of erroneous computatio well as cases where quantities arbitrarily increased to cover f contingencies. Furthermore, items important to estimating, as areas of forms for concrete, s piling for the protection of exc tions and the like are rarely furni Of course all items have to be i preted with the eye of engineerin perience and not merely as a m of arithmetic, for sub-surface co tions are very often of comman importance.

Always one of our early step estimating is to set up a construc schedule showing the orderly prog of the work as to time, (Fig. The purpose of this schedule is serve as a guide in estimating h long the various groups of work and pieces of plant will be on the j The organization of the job is b up — in our imagination — sel ing, so far as possible, individual m for the definite positions and comp ing the cost of their services.

Indirect costs

The next step usually is the det mination of general charges or i direct costs, a feature that contai more pitfalls perhaps than dir charges, because usually they are n so apparent. After all, one is n likely to leave out parts of t permanent structure, but the cost of temporary access road may easily b overlooked. The general charges a expenses that have to be absorbed i the contract prices. A good guide f them may be obtained by the stud of Table I. The items shown will f in very well with the average job b are not adequate for every job. Fo

TABLE I—FORM USED AS A GUIDE FOR GENERAL CHARGES

Figures shown are for a hypothetical 15-month job

		Labor	Bills
A	—Supervision and overhead	$131,025	
B	—Mechanical gang	59,500	
C	—Electrical gang	35,100	
D	—Traveling expenses, *10 men, 3 trips, $100 ea*		$3,000
E	—Office expense, *15 months @ $200.*		3,000
F	—Temporary buildings, barricades, etc	6,000	8,000
G	—Trucks and trucking, *1 tr., 15 mos.*	3,600	3,000
H	—Launch and towboat service		
I	—Bridge and ferry tolls		
J	—Pumping, *15 mos., 3 shifts*	14,000	3,000
K	—Plant, in and out; value	18,000	41,800
L	—Plant repairs		3,000
M	—Freight		20,000
N	—Fuel, gas and oil		8,000
O	—Supplies		12,000
P	—Electric connection		500
Q	—Electric lines and lighting	2,000	3,000
R	—Electric energy, *15 mos. @ $1,500*		22,500
S	—Water lines and water supply	500	1,000
T	—Compressed air lines, *5,000 ft. @ .50 cost @ $1.00*	2,500	5,000
U	—Clearing site	250	250
V	—Roads and access	1,000	1,000
W	—Railroad spurs and docks		
X	—Auditing		500
Y	—Winter cost	500	500
Z	—Flood damage		
AA	—Cleanup, on and off	2,000	
BB	—Permits and licenses		200
CC	—Testing		
DD	—Legal and consulting fees		1,000
EE	—Property and sales taxes		1,000
FF	—Miscellaneous taxes		
GG	—Tornado, fire & special insur. }		2,000
HH	—Fidelity bond }		
		$275,975	$143,250

	Number	Rate	Months	Labor
A—Supervision and Overhead				
Manager	1	$1,000	15	$15,000
General superintendent	1	800	15	12,000
Assistant superintendents	2	600	14	16,800
Chief engineer	1	800	15	12,000
Office engineers	1	500	14	7,000
Field engineers	3	350	13	13,650
Rodmen	3	250	13	9,750
Cost engineer				
Safety engineer				
Office manager and paymaster	1	500	15	7,500
Purchasing agent	1	400	10	4,000
Bookkeepers	1	300	15	4,500
Clerks				
Stenographers	1	200	15	3,000
Telephone operators	1	125	15	1,875
Office boy				
Head timekeeper	1	300	15	4,500
Timekeepers	2	200	13	5,200
Material checkers	1	250	15	3,750
Expediters				
Watchmen	2	150	15	4,500
Storeroom men	2	250	12	6,000
				$131,025
B—Mechanical Gang				
Master mechanic	1	500	15	$7,500
Mechanics	4	400	15	24,000
Helpers	4	275	14	15,400
Laborers	4	225	14	12,600
				$59,500
C—Electrical Gang				
Master electrician	1	450	15	$6,750
Electricians	3	400	14	16,800
Helpers	3	275	14	11,550
				$35,100

, duties and other special ex- must be added on work in

.

items set forth in Table I are planatory except that it is per- orthwhile noting that in Item ce Expenses, we include fix- or the job office, telephone, sta- , entertainment and the like. A "Cleanup, On and Off" is nother name for the work of lly cleaning up the site in the

ill be noted that each item of I has a key letter, which facili- making up the estimates by eferencing. This system has importance, since we keep our of account on a job in the same n, using the same key letters he same item numbers as are n the estimate.

Estimate vs. actual cost

asionally during the progress of rk—utilizing the forms already bed and our actual cost experi- o that date—we make a forecast the outcome of the job as to s or losses, the final forecast be- recapitulation of the final job We do this to keep our hands estimating, and to correct in our any mistakes, so as to avoid future at least mistakes of the kind. These forecasts also serve seful purpose of actual job-cost ol. Our attention would be to any item of work the cost of appeared to be over-running stimates and that might require diate attention and correction in eld.

Direct field cost

a similar manner we compute nit costs based upon a quantity y of the items directly entering the work as shown in Tables II IV. We organize imaginary s of men for each item of work compute the daily cost of each . We secure prices for all the rials required, always making to allow a proper percentage for . This item, usually neglected stimating, may run into surpris- large figures. For instance, I ot recall a single case where we not buy three percent more con- than the pay quantities as esti- d by the engineers.

estimating the cost of concrete mportance of forms cannot be emphasized too strongly. The quantity required, in square feet of total area, should be estimated from the plans and classified into plane surfaces, rounded or warped surfaces, and other specialties as the job demands, since the cost of different types of forms varies enormously. On important jobs we very often make rough designs of forms for the sole purpose of cost estimating. It has been our experience that on jobs involving large quantities of concrete the skill with which the forms are handled may determine the success or failure of the job, and forms are always the subject of very careful planning and careful design.

TABLE II—HYPOTHETICAL EXAMPLE OF DIRECT FIELD COSTS OF UNIT ITEM

Item No. 3 — Rock Excavation — Tunnel

Tunnel Labor	Rate per Shift	Total per Shift
1 Heading foreman	$12.00	$12.00
4 Drillers	8.00	32.00
4 Helpers	6.00	24.00
3 Muckers	5.00	15.00
1 Blaster	12.00	12.00
1 Blaster helper	5.00	5.00
1 Shovel operator	16.00	16.00
1 Oiler	9.00	9.00
1 Motorman	7.00	7.00
		$132.00
Top Gang		
1 Top foreman	$8.00	$8.00
1 Top laborer	5.00	5.00
2 Mechanics and drill "doctors"	8.00	16.00
½ Compressor engineer	14.00	7.00
½ Oiler	9.00	4.50
1 Hoist engineer	16.00	16.00
1 Oiler	9.00	9.00
1 Powder watchman	4.00	4.00
1 Pumpman	9.00	9.00
1 Electrician	12.00	12.00
½ Blacksmith	12.00	6.00
½ Blacksmith helper	8.00	4.00
		$100.50
Total cost per 8 hr. shift		$232.50
6 days @ 3 shifts per day @ $232.50 =		$4,185.00
Sunday Watch		
1 Pumpman (double time)	$18.00	
1 Powder watchman	4.00	
	$22.00	
1 day @ 3 shifts per day @ $22.00 =		$66.00
Total labor cost per week		$4,251.00
Progress		
Assumption based on experience. 50 Lin. ft. of heading per week @ 8.5 cubic yards of pay excavation = 425 cubic yards per week.		
Labor unit cost per cu.yd. $\frac{\$4,251.00}{425}$ =		$10.00
Bills		
Powder, 3 lbs. @ 16⅔¢		.50
Blasting caps, wire, tamping bags, etc		.25
Drill steel bits		.50
Disposal of excavated materials		.75
Unit costs (per cubic yard)		$2.00

Slide rule accuracy sufficient

As far as possible we use round figures in extending costs since this procedure helps to avoid mental fatigue. Sometimes simplification of computations is of utmost importance as it seems impossible to finish up a bid on large and complicated jobs until the early morning hours of the day on which the bid is to be submitted. An example of this procedure is that when we arrive at a price for concrete of $21.62\frac{1}{2}$, we may use $21.60. Our estimates are prepared, except for final bid figures, only with slide rule accuracy since we know that a slide rule is more accurate mathematically than the accuracy of our judgment as to the cost of the work.

In this connection, care should be used to make sure that the quantities involved in no item are so large that the use of round figures will radically affect the bid. For example, we know of one instance where a contractor missed a large waterfront job through failure to observe this caution. It happened that the timber was bid by the board foot instead of the customary thousand board feet. The agreed price was 9.73 c. per board foot, but the young engineer who filled in the bid prices wrote down the figure of 9.8 c. without realizing that for 10,000,000 b.ft. there was an unintentional increase of $7,000 in the bid, sufficient to cost him the job.

Subcontracting

In heavy engineering construction work, the matter of subcontracting is usually not of great importance, because the great bulk of the work is done by the general contractor's own forces. In this regard, heavy construction differs radically from building construction, where nearly all the work is done by subcontractors who are specialists in their several fields. Nevertheless, subcontractors are sometimes quite important, and prices from old and well-established companies are often of great value while those from new companies should not be disregarded.

The subletting of work to unknown or unreliable firms, however, is extremely hazardous. Such a subcontractor may not have the resources or the ability to complete his part of the work, so the direct cost of the item involved may turn out to be greatly in excess of that allowed in the estimate. Even more important, his failure to perform may upset the contractor's time schedule to a point where the cost of other items may be greatly increased.

An example of the latter case occurred on one of our jobs on the Mississippi River a few years ago, where there was a race to complete the concrete work before winter set in. Our operations were well ahead of schedule in the summertime, but we had sublet the dredging to a small but very pleasant and apparently competent dredging contractor. However, by mid-July, when we were ready to construct our second cofferdam well ahead of schedule, "Old Man River" had something to say. There was a flood, not a bad one, but the water unexpectedly rose about eight feet and stayed at that elevation for six weeks while we stood helplessly by because the suctions of the subcontractor's dredges were not long enough to reach the sand to be moved from the bottom of the river.

This man's bid on $150,000 worth of work had been $20,000 below the price of the best companies and we had unwisely used it. The delay threw our operations into the winter, with the resulting unexpected costs for heating, and we were lucky to get out of the difficulty at an increased cost of only $50,000. Had we given the work to the next higher bidder we would have been $30,000 better off, as the dredges that would have been put on the work had adequate reach for the existing condition.

Separate estimates reconciled

In all our estimates, the labor and material costs are kept separate for each item of work. To the total of labor costs is added the cost of workmen's compensation, public liability and unemployment insurance as well as social security and other necessary payments. To the material costs (bills) are added any sales tax or other local or state taxes. The sum of the above, including direct costs, general charges and miscellaneous expenses is the "total cost" of the work as shown in Table III. It is this figure, as obtained by each estimating group separately, that must be reconciled. The independently prepared estimates are compared item by item, and each difference restudied.

Now comes the item of "mark-up", the sum to be added to the total cost to cover contingencies and profit. It is our belief that the average contractor does not add a sufficient mark-up—in other words, that he bids too low. Any intelligent contractor must realize that an engineering estimate is at best, only an expression of opinion, which he is willing to back up with his own money.

Variations in bids are sometimes so great that one is inclined to doubt the sanity of the bidders. For example, on a section of the Sixth Avenue Subway in New York City, recently completed by us, the three lowest bids were approximately $7 million, $8 million and $9 million. Even in our own office, two independent estimating groups will arrive at figures as much as 25 percent apart!

Make the mark-up adequate

Under the circumstances it is obvious folly, except on the simplest kind of work, to use a mark-up of, say, 10 percent. Our mark-ups vary with the type of work and the hazards involved but generally the minim for contingencies alone, is 10 perc increasing with the hazard wind, weather and water, plus percent for profit. The net result 900 contracts, over 25 years, agg gating about $150,000,000 has been net profit of something under 10 p cent, the rest of the mark-up havi been absorbed by contingencies, ce tral office and storeyard expense.

TABLE III—SUMMARY OF ALL COSTS, INCLUDING MISCELLANEOUS AND MARK-UP ITEMS

Item	Labor	Bills
Direct costs	$500,830	$207,000
General charges	276,000	143,250
Total labor and bills.	$776,830	$350,250
*WC, PL, SS, UI @ 16%	124,300	
Total labor and insurance	$901,130	
Total bills	350,250	
Sales tax on bills	8,000	
Total cost	$1,259,380	
Mark-up, ----%	360,000	
Total cost and mark-up	$1,619,380	
Bond, ¾%	12,200	
Gross receipts	$1.631,580	
Gross receipts, Tax --%	1,500	
Total bid	$1,633,080	

Mark-up determined from approximately—20% of total cost
= 20% of $1,259,380 = $252,000
or
40% of labor and insurance
= 40% of $901,130 = $360,000
Use whichever is greater.

$$\text{Factor} = \frac{\text{Total bid}}{\text{Direct costs}} = \frac{\$1,633,080}{\$707,830} = 2.31$$

---

* *Workmen's Compensation, Public Liability, Social Security, Unemployment Insurance.*

A factor that must be considered determining mark-up is the ratio labor costs to material costs. T figures given above are based up a usual case of labor and materi costs being practically equal. As matter of fact, the labor is the mo variable item so that a 20-perce mark-up on the total cost is really 40-percent mark-up on the labor. shown under Table III we compa 20 percent of the total cost with percent of the labor and insuran and then use whichever figure greater as the mark-up.

In some cases, important materi items are furnished by the contractin authorities. A simple method of han ling such a situation is to include th value of such materials, apply th mark-up based upon the total size o the job, and then credit back the materials furnished.

Bid your own costs

It is our feeling that the averag contractor does entirely too muc worrying about his competitors. Any contractor who is "out to get a job" will usually get it, and in many cases to his sorrow. Our philosophy as t mark-up is to disregard our competitors, and to devote our attention to the difficulties of the work, to what we think it will cost, and having decided upon that, to add what we feel is a proper mark-up. Thus, when chance places us as the low bidder, we have a good opportunity to make a profit, and needn't compete for a job twice—first against our competitors and a second time, against the natural difficulties of the work.

A contractor should be particularly conservative when "he needs a job," that is, when he is out of work. In such cases, in figuring his costs he is likely to close his eyes to many inherent hazards, and then add too low a mark-up. There is an old saying in the contracting business that no contractor ever goes broke on the job he doesn't get.

TABLE IV—TABULATION OF DIRECT COSTS AND FINAL UNIT BID ITEMS

			Direct Costs						Preliminary Bid (Total costs ×factor)*		Final Bid (to be submitted)	
			Labor		Bills		Total costs					
Description	Quanity	Unit	Unit	Total	Unit	Total	Unit	Total	Unit	Total	Unit	Total
Earth exc.—shafts.........	200	cu.yds.	$5.65	$1,130	$4.50	$900	$10.15	$2,030	$23.50	$4,700	$24.40	$4,880
Rock exc.—shafts.........	550	cu.yds.	14.00	7,700	2.00	1,100	16.00	8,800	37.00	20,300	44.00	24,200
Rock exc.—tunnels........	42,000	cu.yds.	10.00	420,000	2.00	84,000	12.00	504,000	27.70	1,162,000	28.00	1,176,000
Concrete (shafts & tunnels).	10,000	cu.yds.	6.00	60,000	10.00	100,000	16.00	160,000	37.00	370,000	35.00	350,000
Steel rods & bars..........	300	Tons	40.00	12,000	70.00	21,000	110.00	33,000	254.00	76,200	260.00	78,000
Total direct cost..............................				$500,830		$207,000		$707,830				

Prelim. total bid $1,633,200

Final bid $1,633,080

*Factor = 2.31

Competition is the basis of our business system and we believe it has done more to produce our present efficiency than any other factor. However, competition should not be based upon profit margins but upon the relative ingenuity and efficiency of the competing contractors. The contractor who is out of work already has an advantage, which in itself should cure his condition. He has available all his plant and a trained organization, while his busy competitor must buy or hire new plant and rely upon a new and untried organization.

The final bid

On a lump-sum bid, having applied his mark-up, the contractor has only to add in the cost of the bond and hand in the bid. On a unit-price job there is still much work to be done. The direct cost of each item has already been determined, but obviously each item must carry its share of general charges, taxes, mark-up and other items.

We take care of this by the application of a "factor," which can best be described by the example in Table III. In the example given the total direct cost of all items is $707,830, and the "total bid" including general charges, supervision, overhead, job office and plant, taxes, mark-up, bond and direct cost is $1,633,080. To carry a proper share of the general charges, the direct cost of each bid item must be increased in the proportion that the total bid bears to the total direct cost, *i.e.*, $1,633,080 to $707,830 or 2.31, which is the factor computed in Table III. Application of this factor will produce a balanced bid for each item, see Table IV.

At this point the contractor has an opportunity to use his skill, experience and judgment. As has been stated previously, the bid quantities may be grievously in error. This may be due to erroneous computations by the engineers, or may have been done purposely to cover contingencies. In any case, a skillful contractor will to some extent, but without changing his total bid, raise the price on items he thinks are under estimated, and lower his price on items that are over estimated as to quantity in the bid sheets to meet this situation.

All of the above is subject to a rule we never break—never bid any item below "direct" cost. The importance of thoughtful "balancing" can be illustrated by a subway job with which we were connected as managing engineers. With no other factors involved, the tendency on any job is to "put the money" on early items—in subway work, on the excavation. On this particular operation the successful bidder had put the greater portion of his overhead and profit on the excavation, without noting that the bid quantities had been over estimated about 10 percent. The result was that when the work was completed, the contractor received nearly $300,000 less income than anticipated.

If before bidding, this contractor had made an accurate quantity survey, he would have discovered that the given quantity for excavation did not exist and would have bid the item differently. General charges, overhead and profit could have been allocated elsewhere, preferably to lump-sum items that could not be reduced.

Eight rules for estimating

There is no substitute for engineering judgment and experience, but it is hoped that the methods briefly described herein may be of some value to others as they have been to us for 25 years. Briefly restated, they are—study conditions in the field, with particular emphasis on subsurface conditions, make a careful quantity survey, study the plans and specifications, make up a time schedule, make two independent estimates of cost, include all general charges, disregard your competitors and then add a proper mark-up.

The chief engineer of one of the companies associated with us on a large tunnel and some war work recently made an important analysis that is given here as worthy of every contractor's consideration. As this firm has done public work exclusively for 20 years, it was possible to review the bids on all the work done over that period. He found that if the firm had bid 10 percent more on every job they still would have been low bidder on 40 percent of all the jobs. On this 40 percent of the jobs, which they would still have obtained if they had added 10 percent to every bid, they could have made twice the net profit that they actually made on all of the jobs constructed; and they would have avoided all the "headaches"—the low-priced jobs.

How not to bid

Having tried herein to generally advise contractors how to bid, it might be well to conclude with a notorious example of how not to bid. From 1930 to 1937, the period of the depression, The U. S. Army Engineers let contracts for a series of locks and dams on the Mississippi River from St. Paul, Minn., to St. Louis, Mo. Although the work was of the most hazardous type, contracts were scarce and the contractors were "work hungry," with the result, I am told, that of 52 contracts only 13 ended up in the "black." In the aggregate, the government purchased $135,000,000 worth of work for 4 percent less than the contractors' costs. In our opinion, concurred in by the Army Engineers, this result was not in the government's interest. It certainly was not in the interest of the contractors.

Construction Cost Data

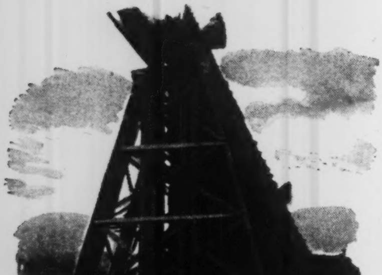
FROM KOPPERS

Koppers will be glad to work with you on cost data for any
the products listed here.

Automotive Replacement Piston Rings
Benzol Recovery Plants
Blue Gas Plants
Boat and Barge Building
Boilers—Waste Heat
Bridge Timbers—Treated
Bronze—D-H-S—for dams
Bunker Oil Water Gas Processes and Apparatus
Coal and Coke Conveying Plants
Coke Ovens
Concrete Priming Oil
Controls—Time, Cycle and Water Gas Set
Couplings—Fast's Self-aligning
Creosote
Creosoted Forest Products
Cross Arms—Treated
Cross Ties—Treated
Crossing Plank—Treated
Culverts—Treated
Dampproofing Materials
Dehydration Systems
Dock Timbers—Treated
Fence Posts—Treated
Flooring—Pressure-treated wood
Floor Plate—Rolled Steel
Gas Holders
Gas Plants
Gas Purification
Gasoline Desulfurization Plants
Generators—Water Gas
Guard Rails—Treated
Light Oil Refining Processes
Locomotive Packing
Lumber—Treated
Motor Fuel Recovery Plants
Paints and Coatings—Bituminous
Piling—Treated
Piston Rings
Road Tars—Tarmac
Roofing Materials, Coal Tar
Sluice Gates
Tar
Ties—Treated
Valves—All-Iron Goggle
Waterproofing Materials

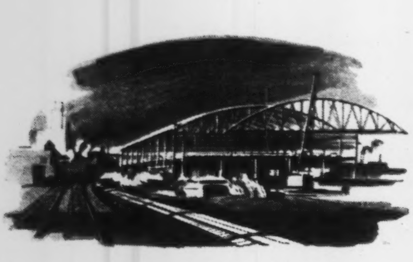
Coal Tar Pitch Waterproofing

Coal Tar Pitch Roofing

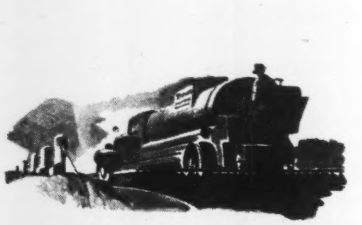


Pressure-treated Ties, Bridge Timbers, Culverts, Dock Timbers, etc.

KOPPERS COMPANY, INC.
Pittsburgh 19, Pennsylvania



Pressure-treated Piling, Roof Trusses and other Structural Lumber



Tarmac Road Tars for Access Roads, Airports, Highway Maintenance, etc.

Contract Unit Bid Prices

Selected list of 54 projects showing how contractors bid in 1944-1945

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POWER PLANT UNIT DESCHUTES PROJECT, ORE.

OWNER: Bureau of Reclamation, Bend, Ore. S. O. Harper, chief engineer.

PROJECT: Construction of Unit 3, Cove Power Plant, north of Bend, Ore. New building, 29-ft. 7-in. by 50-ft., to be reinforced concrete, except for wood roof covered with 5-ply built-up roofing and supported by steel roof beams. Penstock, to be of reinforced concrete, is provided with trashrack and radial gate at intake, and terminates in spiral-type turbine scroll case formed in second-stage concrete of the powerhouse. Contract also includes removal of portion of existing concrete forebay to permit installation on new concrete penstock, siphon wasteway and side-channel wasteway; improving crest of existing overflow spillway at upper end of forebay; temporary cofferdam across existing forebay; relocating and reconstructing flume and ditch above power plant; constructing access road and reinforcing bridge; construction of Cove switchyard; and transportation of materials furnished by Government.

CONDITIONS: Contractor to furnish exhaust fan, fixed louver, adjustable dampers, embedded and exposed conduits for switchyard and powerhouse, and grounding system. All other materials forming permanent part of structure to be furnished by Government. Relocation of telephone or power lines to be performed by Pacific Power & Light Co. Railroad transportation available to Culver, and highway to site of work. Contract time is 300 calendar days. Wage rates are: skilled labor, $1.25 to $2.00 per hour; semi-skilled, 95c. to $1.25; and common, 95c. Existing power units must continue output except at times expressly stipulated in specifications.

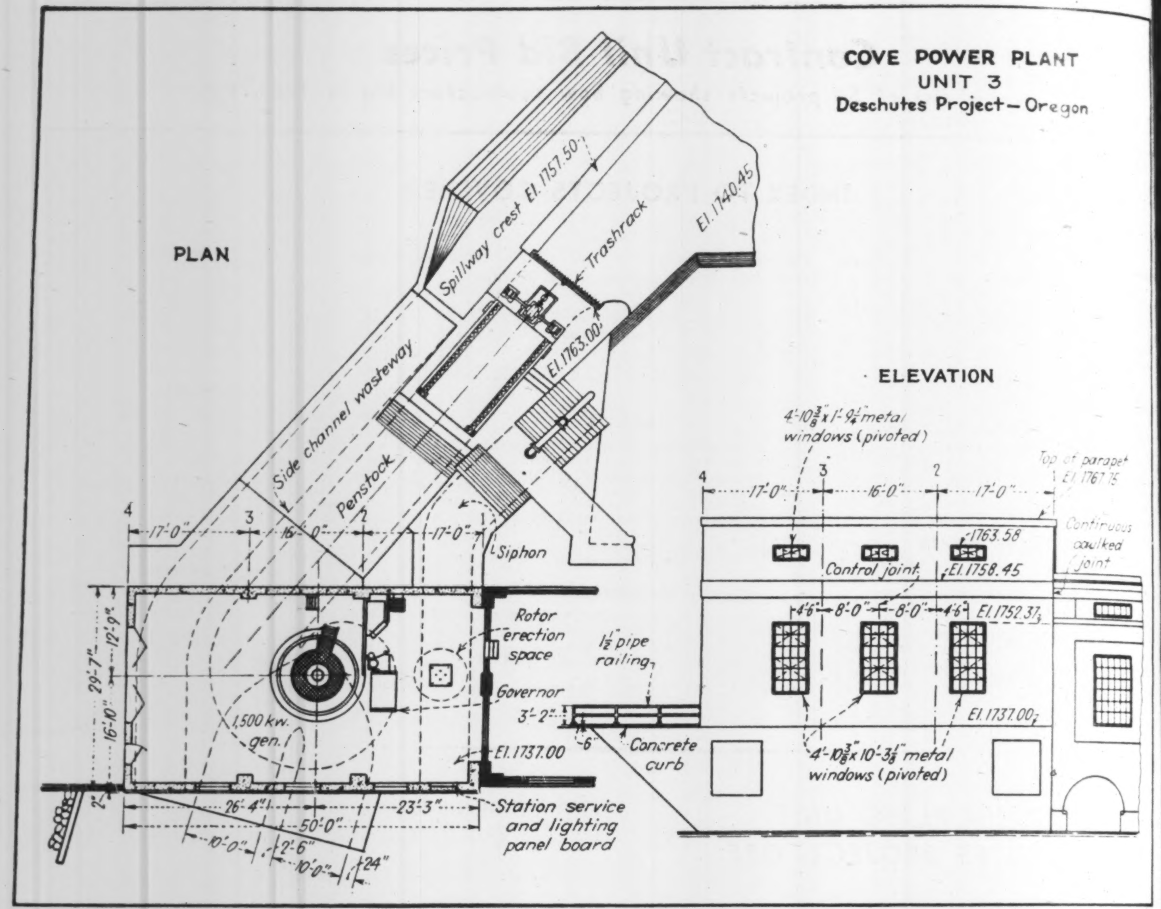
BIDS: Five bids were received September 6, 1944 ranging from the low of $122,968 to $244,303.

LIST OF BIDDERS:

1. C. J. Montag & Sons, Portland, Ore. (low bidder)	$122,968
2. Scheumann & Johnson, Seattle, Wash.	183,815
3. Morrison-Knudsen Co., Boise, Idaho	184,815
4. Vernon Brothers Co., Boise, Idaho	193,775
5. C. F. Davidson Co., Tacoma, Wash.	244,303

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Cofferdam forebay and unwater foundn	Lump Sum	$5,000.00	$3,000.00	$1,000.00
2. Relocate and maintain exist. flume and ditch	Lump Sum	600.00	1,000.00	750.00
3. Reinforce bridge across power canal	Lump Sum	200.00	300.00	500.00
4. Excav., all classes, for powerhouse,penstockand wasteways	4,700 c. y.	4.00	8.00	5.00
5. Drilling line holes for rock excav.	500 l. f.	.50	2.00	2.00
6. Excavation, all classes, for road.	1,900 c. y.	2.00	2.00	2.50
7. Road and turning area surfacing.	100 c. y.	5.00	8.00	1.75
8. Stone barrier at edge of road and turning area	100 l. f.	3.00	2.00	3.00
9. Excavation, all classes, for cove switchyd	150 c. y.	6.00	5.00	5.00
10. Excavation of concrete	160 c. y.	6.00	30.00	12.00
11. Backfill	900 c. y.	.75	2.00	.75
12. Compacting backfill	200 c. y.	.75	2.00	2.50
13. Place tamped gravel fills	30 c. y.	7.00	8.00	5.00
14. Overhaul	3,000 c. y.	.10	.10	.10
15. Rock fills	400 c. y.	1.00	4.00	1.50
16. Dumped riprap	250 c. y.	2.00	4.00	2.50
17. Dry-rock paving	400 s. y.	5.00	5.00	7.00
18. Conc. in powerhouse substructure	540 c. y.	25.00	50.00	50.00
19. Conc. in powerhouse superstructure	200 c. y.	31.00	45.00	85.00
20. Second-stage conc. in powerhouse	330 c. y.	25.00	50.00	50.00
21. Conc. in penstock, spillway and wasteways	600 c. y.	35.00	50.00	65.00
22. Conc. in structures for cove switchyard	35 c. y.	35.00	40.00	70.00
23. Reinforcing bars	210,000 lb.	.065	.07	.105
24. Chip and roughen conc. surface	25 s. y.	2.00	5.00	2.00
25. Drilling holes for anchor bars and grouting bars in place	50 l. f.	1.00	3.00	1.00
26. Furn., fabricate, install galv. metal seals	800 l. f.	.75	2.00	1.25
27. Fabricate, install metal deflector for siphon wasteway	Lump Sum	50.00	100.00	35.00
28. Construct control joints, except calking	60 l. f.	.50	2.00	1.20
29. Calk grooves in control joints and of joints between old and new buildings	120 l.f.	.50	2.00	1.00
30. Constr. powerhouse roof, except str. steel roof beams	Lump Sum	1,500.00	1,500.00	2,000.00

(*Continued on page 172*)



COVE POWER PLANT
UNIT 3
Deschutes Project—Oregon

PLAN
ELEVATION
Spillway crest El. 1757.50
Trashrack
El. 1740.45
El. 1763.00
Side channel wasteway
Penstock
Siphon
Rotor erection space
Governor
1,500 kw. gen.
El. 1737.00
1½" pipe railing
Concrete curb
Station service and lighting panel board
17'-0"
16'-0"
29'-7"
12'-9"
16'-10"
3'-2"
6"
2'
26'-4"
23'-3"
50'-0"
10'-0"
2'-6"
24"
4'-10⅜" x 1'-9¼" metal windows (pivoted)
Top of parapet El. 1767.75
Continuous caulked joint
1763.58
El. 1758.45
Control joint
4'-6"
8'-0"
El. 1752.37
El. 1737.00
4'-10⅜" x 10'-3⅛" metal windows (pivoted)
1
2
3
4

POWER PLANT UNIT DESCHUTES PROJECT, ORE. (cont'd.)

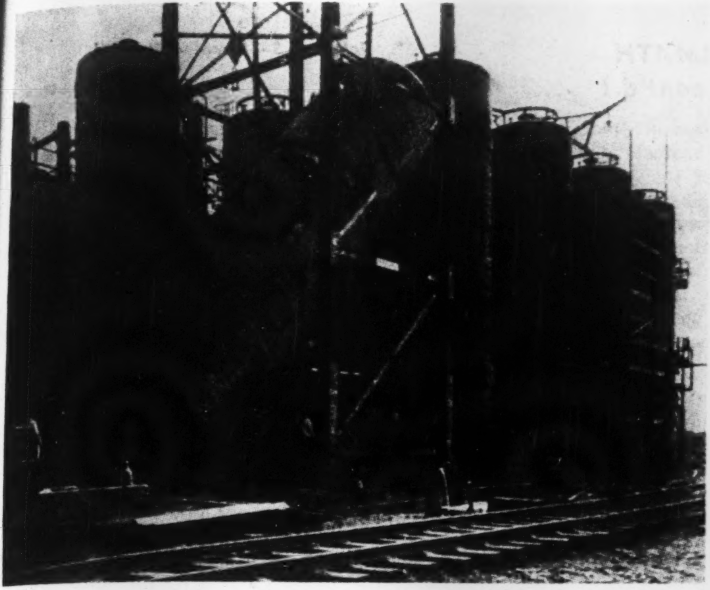
31. Str. steel roof beams and trolley beams	4,000 lb.	.75	.30	.10
32. Embedded anchors for turbine	600 lb.	.25	.25	.30
33. Pier nosing, furn. and install	350 lb.	.25	.50	.30
34. Embedded metal pipe, fittings and accessories	4,000 lb.	.50	.50	.20
35. Exposed metal pipe, fittings, valves and accessories	1,500 lb.	1.00	.60	.15
36. Pipe handrails	500 lb.	.50	.40	.50
37. Miscellaneous metalwork	2,000 lb.	.30	.50	.50
38. Install. trashracks, scroll-case access door and frame, and adjustable siphon breaker	12,000 lb.	.10	.10	.15
39. Install radial gate	12,000 lb.	.06	.10	.15
40. Install radial gate hoist	4,000 lb.	.10	.10	.10
41. Install two 8-ton hoists, I-beam trolleys	Lump Sum	200.00	250.00	200.00
42. Install turbine parts embedded in conc.	Lump Sum	3,600.00	3,000.00	1,500.00
43. Inst. generator and governor anchor bolts	400 lb.	.10	.50	.30
44. Exhaust fan, louver and dampers	Lump Sum	1,000.00	400.00	500.00
45. Doors and windows, complete, with all hardware	Lump Sum	700.00	600.00	750.00
46. Embedded electr. metal conduit, 1-in. or less in dia.	1,100 l. f.	.25	.50	.60
47. As above, 1 to 3-in. in diameter	750 l. f.	.75	1.00	1.50
48. Embedded electr. non-metallic conduit in powerhouse and switchyard	1,250 l. f	.50	1.00	1.00
49. Exposed electr. metal conduit, 1-in. or less, in power plant	750 l. f.	.25	.70	.60
50. Exposed electr. metal conduit, 1 to 3-in. diameter	700 l. f.	.75	1.00	1.50
51. Exposed electr. non-metallic conduit	450 l. f.	.50	1.00	1.00
52. Furn. and install grounding system	200 lb.	.50	1.50	2.75
53. Transport freight furn. by Gov't. (from Culver, Ore. to Cove power plant	600 ton	5.00	5.00	2.50
54. As above, from Terrebonne, Ore. to Oromite Substation	15 ton	6.00	5.00	3.00
55. As above, from Redmond, Ore. to Redmond Substation	55 ton	4.00	3.00	1.50

PUMPING PLANTS, KLAMATH PROJECT, OREGON-CALIFORNIA

OWNER: Bureau of Reclamation, Modoc Unit, Tule Lake Division, Klamath Project, Oregon-California, Klamath Falls, Ore.

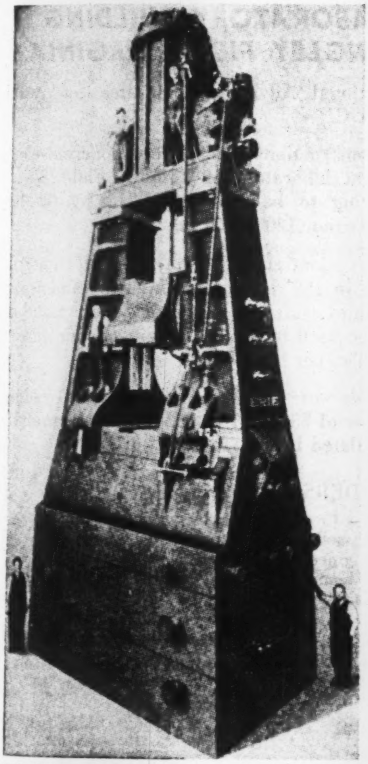
PROJECT: Excavation, backfill, grading and placing of gravel and dry-rock paving; construction of three pump houses (A, B, and C), each complete with substructure, intake structure and superstructure; construction of three 30-in. discharge lines for each plant; outlet structures for each plant; placing of concrete canal lining in canal over completed discharge line for Plant A; install structural steel and miscellaneous metalwork, conduits, conductors, hand-operated hoist and trolley for Plant C, flap valves, motor-driven pumping units. Substructures, intake structures and discharge lines for Plants A and B to be of concrete; foundation slab for pump house at Plant A to be supported on timber piles; substructure and discharge lines for Plant C to be of wood construction, except for concrete foundation slabs under the pump house and the concrete collars for supporting discharge lines at building wall. Round timber piles to support pump house for Plant C and timber sheet piling to be driven to form sides of intake. Pumphouse superstructures for three plants to be wood-frame construction, and include hoist framework, and hatch openings with removable covers in roofs. Plants A and B are identical, except for door and window locations. Project is located near Tulelake, Calif.

(Continued on page 174)



▲ Views showing progress of the work of erecting converters at Butadiene-Styrene Plant, Kobuta, Pa.

The old furnace continued to produce pig iron while this new furnace was being erected 112 feet away. The old furnace was then dismantled and the new furnace moved on to the old foundation.



Erie Steam Hammer (450 tons) installed in a Defense Corp. Plant.

12,000 ton Bell Telephone Co. building, Indianapolis, Ind. was moved 52 ft. and pivoted 90 degrees to front on another street. ▼

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EICHLEAY, 33 S. 19th Street, Pittsburgh, Pa.

PUMPING PLANTS, KLAMATH PROJECT, ORE.-CALIF. (cont'd.)

CONDITIONS: Government to furnish cement; pumping units complete; flap gates; machinery enamel; and all materials for electrical installations except structural steel angles, roof-flashing sleeves, plugs for plugging conduits, and paint and soldering materials required for making electrical connections. Government-furnished material to be delivered to contractor at railway station most convenient to the work. Time for completion: 180 calendar days. Access to work from existing roads to be provided by contractor. Wage rates are: skilled labor, $1.25 to $1.75 per hour; semi-skilled, 75c. to $1.25; and common labor, 85c.

BIDS: Five bids were received July 28, 1944 on the three plants combined. They range from the low of $90,688 to $131,900.

LIST OF BIDDERS:

1. Clifford A. Dunn, Klamath Falls, Ore. (contract)	$ 90,688
2. Tru-Mix Concrete Co., Medford, Ore.	104,555
3. S. Relyea & Sons, Boise, Idaho	110,000
4. Scheumann & Johnson, Seattle, Wash.	123,985
5. Arthur Pinner, Jr., Los Angeles, Calif.	131,900

Schedule 1—Pumping Plant "A"

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common	3,000 c. y.	$2.65	$2.00	$1.00
2. Backfill	1,200 c. y.	.50	1.00	.60
3. Compacting backfill	500 c. y.	1.00	1.00	4.00
4. Furn. and place dry-rock paving	26 s. y.	5.00	6.00	4.00
5. Furn. and place gravel around weep holes	15 c. y.	5.00	10.00	15.00
6. Conc. in substructure of pumphouse	239 c. y.	34.00	40.00	45.00
7. Conc. in discharge lines and outlet	80 c. y.	52.00	50.00	50.00
8. Conc. in canal lining for "J" canal	23 c. y.	30.00	30.00	35.00
9. Reinforcement bars	46,000 lb.	.09	.11	.07
10. Construct contraction joints in discharge lines	9 ea.	25.00	50.00	75.00
11. Constr. water-seal joints in disch. lines	3 ea.	86.00	50.00	50.00
12. Furn., drive vertical timber piles	560 l. f.	1.70	3.45	3.50
13. Furn., drive batter timber piles	665 l. f.	1.95	3.95	4.00
14. Construct pumping plant	Lump Sum	2,400.00	4,000.00	8,509.10
15. Install flap gates	2,800 lb.	.06	.25	.10
16. Furn., install welded plate-steel discharge pipe connections	6,800 lb.	.20	.30	.30
17. Miscellaneous metalwork	8,500 lb.	.22	.30	.30
18. Install pumping units	25,000 lb.	.04	.02	.06
19. Install electr. metal conduit, under 1-in. dia.	200 l. f.	.50	.45	.10
20. As above, 1 to 2½-in. dia.	70 l. f.	2.00	1.80	.12
21. As above, 2½ to 4-in. dia.	40 l. f.	2.75	2.50	.15
22. Install electrical conductors, ground wires and apparatus	2,100 lb.	.34	.31	.06

Schedule 2—Pumping Plant "B"

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common	970 c. y.	$2.50	$2.00	$1.00
2. Excavation, rock	535 c. y.	5.00	4.00	3.00
3. Backfill	550 c. y.	.50	1.00	.60
4. Compacting backfill	50 c. y.	1.00	1.00	4.00
5. Furn. and place dry-rock paving	40 s. y.	5.00	6.00	3.00
6. Conc. in substructure of pump house	190 c. y.	30.00	40.00	45.00
7. Conc. in discharge lines and outlet	59 c. y.	52.00	50.00	50.00
8. Furn. and place reinforcement bars	37,000 lb.	.09	.11	.07
9. Constr. contraction joints in discharge lines	9 ea.	25.00	50.00	75.00
10. Constr. water-seal joints in discharge lines	3 ea.	86.00	50.00	50.00
11. Construct pumping plant	Lump Sum	2,400.00	4,000.00	8,509.10
12. Install flap gates	2,800 lb.	.06	.25	.10
13. Furn., install welded-plate steel discharge pipe connections and float guides	6,800 lb.	.20	.30	.30
14. Miscellaneous metalwork	11,500 lb.	.22	.30	.30
15. Install pumping units	25,000 lb.	.04	.02	.06
16. Install electr. metal conduit, under 1 inch	260 l. f.	.50	.45	.10
17. As above, 1 to 2½-in. dia.	80 l. f.	2.00	1.80	.12
18 As above, 2½ to 4-in. dia.	40 l. f.	2.75	2.50	.15
19. Install electr. conductors, ground wires, and apparatus	2,100 lb.	.34	.31	.06

Schedule 3—Pumping Plant "C"

Item	Quan.	Unit Prices (1)	(2)
1. Excavation, common	1,650 c. y.	$4.50	$3.00
2. Backfill	550 c. y.	.50	1.00
3. Compacting backfill	50 c. y.	1.00	1.00
4. Furn. and place dry-rock paving	40 s. y.	5.00	6.00
5. Furn., place gravel around weep holes and pump house	200 c. y.	5.00	10.00
6. Conc. in foundation slabs of substr.	50 c. y.	30.00	45.00
7. Conc. in collars and outlet for discharge lines	25 c. y	60.00	55.00
8. Furn., place reinforcement bars	10,000 lb.	.09	.11
9. Furn., drive vertical timber piles	650 l. f.	2.00	5.75
10. Furn., drive batter timber piles	300 l. f.	1.90	3.95
11. Furn., fabricate, drive timber sheet piling	2.5 M bm	200.00	250.00
12. Construct pumping plant	Lump Sum	5,686.00	4,250.00
13. Furn., install wood discharge lines	Lump Sum	1,227.60	1,200.00
14. Install flap gates	2,800 lb.	.06	.25
15. Furn., install welded-plate steel discharge pipe conn. and float guides	6,800 lb.	.20	.35
16. Miscellaneous metalwork	2,000 lb.	.22	.25
17. Install pumping units	25,000 lb.	.04	.04
18. Furn., install 5-ton hoist and trolley	Lump Sum	650.00	350.00
19. Inst. electr. metal conduit, 1-in. or less in dia.	240 l. f.	.50	.45
20. As above, 1 to 2½-in. dia.	100 l. f.	2.50	1.80
21. As above, 2½ to 4-in. dia.	40 l. f.	2.75	2.50
22. Install electr. conductors, ground wires, and apparatus	2,100 lb.	.34	.31

LABORATORY BUILDING LANGLEY FIELD, VIRGINIA

OWNER: National Advisory Committee for Aeronautics, Washington, D. C.

PROJECT: Construction of reinforced concrete electric aircraft instrument laboratory at Langley Field, Va., for the NACA. Building to be T-shaped; 217 by 52 ft.; three stories; rear portion 120 by 65 ft.

CONDITIONS: Contractor to furnish all materials and complete work in 152 days. Rail, highway and water transportation facilities available. Building concrete and unskilled laborers will be used to a large extent on this project, both at the rate of 65c. per hour.

BIDS: Four bids were received March 28, 1944 ranging from the contract low of $504,367 to $653,315. An analysis of the low bid is tabulated below.

LIST OF BIDDERS:

1. F. D. Rich & Co., Inc., New York, N. Y. (contract)	$504,367
2. Doyle & Russell, Richmond, Va.	611,827
3. Virginia Engineering Co., Inc., Newport News, Va.	641,200
4. Grannis, Thompson, Street, Wattinger Co., Richmond, Va.	653,315

Trade	Analysis of Low Bid Price: Mat'l. Price	Labor Price	Total
1. General conditions	$1,885	$8,000	$9,885
2. Excavation (4,950 c. y.)	....	8,910	8,910
3. Piling	19,200	7,255	26,455
4. Concrete (4,300 c. y.)	65,500	52,500	118,000
5. Reinforcing steel	13,527	5,200	18,727
6. Masonry, stone and brick	12,100	13,165	25,265
7. Masonry block (11,000 c. f.)	9,300	10,100	19,400
8. Misc. iron and steel	4,000	300	4,300
9. Kalamein work	200	98	298
10. Roofing and sheet metal work	3,500	3,587	7,087
11. Lathing and plaster	1,500	1,567	3,067
12. Carpentry	16,585	10,000	26,585
13. Caulking	77	240	317
14. Waterproofing	1,526	2,300	3,826
15. Screening	1,300	286	1,586
16. Weather-stripping	566	700	1,266
17. Hardware	2,100	304	2,404
18. Painting	1,500	3,500	5,000
19. Shades	700	57	757
20. Tile and terrazzo	600	600	1,200
21. Slate	550	150	700
22. Marble	4,700	500	5,200
23. Acoustical work	4,950	4,000	8,950
24. Plumbing	26,000	14,500	40,500
25. Heating and ventilating	62,000	31,100	93,100
26. Electrical work	38,200	26,732	64,932
27 Monorail hoist	850	100	950
28. Elevator	5,000	700	5,700
	$297,916	$206,451	$504,367

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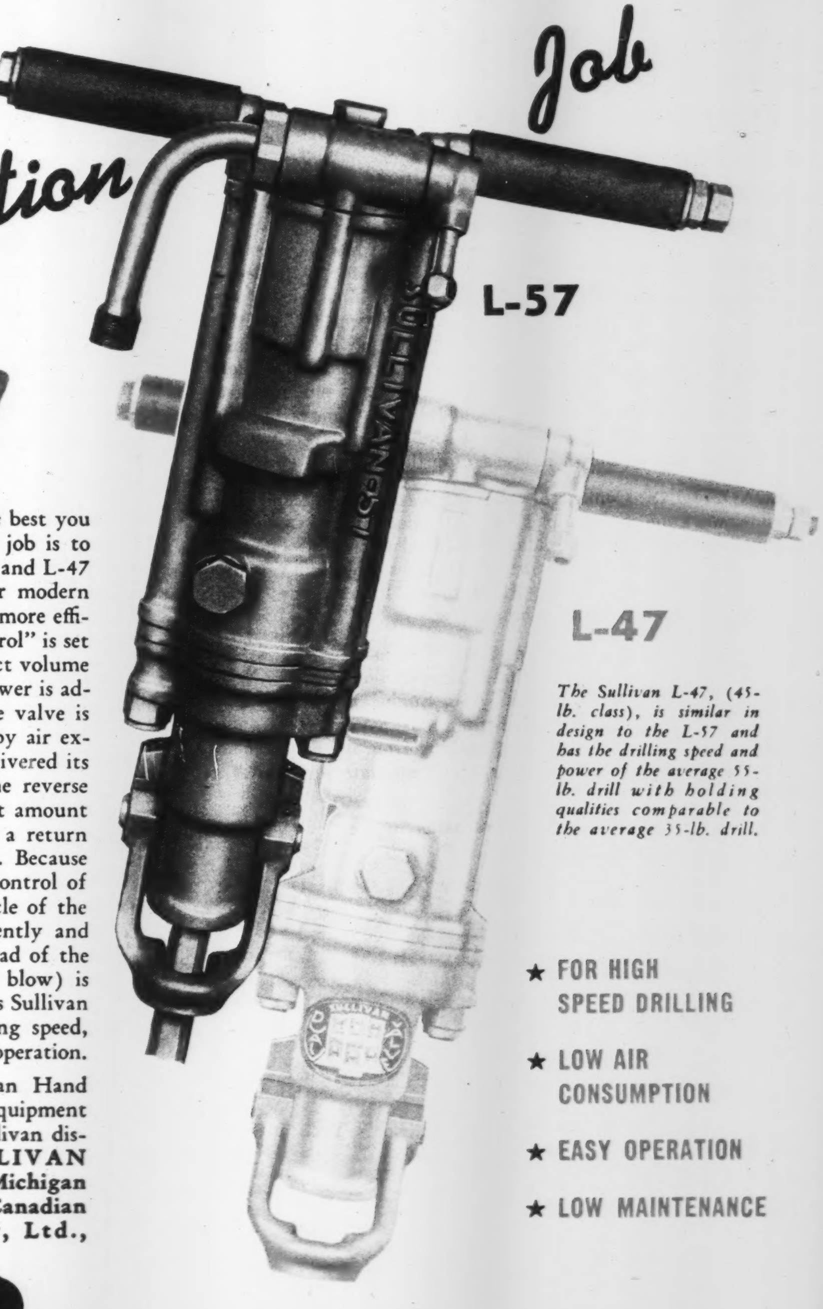

The Sullivan L-47, (45-lb. class), is similar in design to the L-57 and has the drilling speed and power of the average 55-lb. drill with holding qualities comparable to the average 35-lb. drill.

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AIRPORT, DANVILLE, VA.

OWNER: Civil Aeronautics Administration, First Region. LaGuardia Field, N. Y.

PROJECT: Clearing, grading, draining and paving the Danville, Virginia Municipal Airport, consisting of the following: 1,600,000 cu.yd. of excavation necessary for grading three runways and taxiways; 45,000 feet of pipe for field taxiway, runway and outfall drainage; paving three runways, 5,000 ft. by 150 ft. and taxiway 9,700 ft. by 50 ft., together with necessary apron; and other appurtenant work within limits of airport property if ordered. Alternates were allowed for concrete paving (Schedule II) or for bituminous paving (Schedule III). Also combined site preparation (Schedule I) and concrete paving (Schedule IV) and for combined site preparation and bituminous paving (Schedule V). Contracts were awarded on basis of Schedules I and III, separately. Unit price tabulations shown below are on this basis.

CONDITIONS: Contractors to furnish all materials and complete work on Schedule I in 120 calendar days, and on Schedule III in 110 calendar days. Rail and highway transportation facilities available. Wage rates specified as minimums are: skilled labor, $1.00 to $1.50 per hour; semi-skilled, 60 to 75c.; and common, 50c.

BIDS: Fifteen bids were received on Schedule I (Preparation of site) February 15, 1944. They ranged from the contract low of $508,463 to $1,125,766. Engineer's estimate was $696,092. On Schedule III (Bituminous paving) seven bids were opened on the same date, ranging from the contract low of $702,660 to $2,737,358. Engineer's estimate was $962,972.

Schedule I—Preparation of Site

LIST OF BIDDERS:

1. Mecklenburg Constr. Co., Durham, N. C. (contract)	$508,463
2. The Grandview Co., Mt. Vernon, N. Y.	549,009
3. Chandler Bros., Inc., Virgilina, Va.	581,633
4. McVaugh-Haynes Co., Peoria, Ill.	618,189
5. Kiker & Yount, Reidsville, N. C.	638,682
6. Ralph Myers Constr. Co., Salem, Ind.	675,153
7. Reiss & Weinsier, Inc., Brooklyn, N. Y.	741,691
8. Albert Bros., Salem, Va., and Pendelton Constr. Corp., Wytheville, Va.	770,127
9. M. DeMatteo Constr. Co., Milton, Mass.	789,233
10. Peter Mitchell, Inc., Paul Bacco & Son, Inc., Greenwich, Conn.	791,973
11. Bero Engr. & Constr. Corp., Buffalo, N. Y.	799,994
12. John B. Schultz Contracting Co., Buffalo, N. Y.	829,834
13. S. J. Groves & Sons, Inc., Ridgefield, N. J	848,304
14. John Arborio, Inc., Poughkeepsie, N. Y.	1,084,459
15. Baltimore Contractors, Baltimore, Md.	1,125,766

Item	Quan	Unit Prices (1)	(2)	(3)
1. Clearing and grubbing	Lump Sum	$8,000.00	$10,500.00	$11,500.00
2. Clear and grub (if ordered)	10 ac.	125.00	250.00	180.00
3. Clearing (if ordered)	70 ac.	125.00	125.00	75.00
4. Unclassified excavation	1,600,000 c. y.	.20	.235	.24
5. 8-in. drain pipe, open joint	5,400 l. f.	.60	.45	.70
6. 10-in. drain pipe, open joint	6,150 l. f.	.80	.65	.85
7. 12-in. drain pipe, open joint	7,100 l. f.	.90	.75	1.05
8. 15-in. drain pipe, open joint	10,700 l. f.	1.10	1.25	1.25
9. 18-in. drain pipe, open joint	3,570 l. f.	1.50	1.65	1.80
10. 21-in. drain pipe, open joint	1,750 l. f.	2.10	2.15	2.25
11. 24-in. drain pipe, open joint	1,600 l. f.	2.60	2.95	2.80
12. Unclassified excav. for drain	17,000 c. y.	.30	.40	.55
13. Compacting earth backfill	4,000 c. y.	.30	.35	.90
14. Porous backfill	10,500 c. y.	4.00	3.80	4.60
15. 6-in. drain pipe, sealed joint	300 l. f.	.70	.50	.60
16. 8-in. drain pipe, sealed joint	1,830 l. f.	.95	.65	.75
17. 10-in. drain pipe, sealed joint	450 l. f.	1.05	1.00	1.00
18. 12-in. drain pipe, sealed joint	1,020 l. f.	1.25	1.20	1.20
19. 15-in. drain pipe, sealed joint	2,090 .f.	1.50	1.80	1.45
20. 18-in. drain pipe, sealed joint	1,020 l. f.	2.00	2.50	2.00
21. 21-in. drain pipe, sealed joint	1,110 l. f.	2.50	3.25	2.50
22. 24-in. drain pipe, sealed joint	740 l. f.	3.30	4.50	3.25
23. 12-in. Transite pipe spillway	600 l. f.	2.00	1.80	1.75
24. Circular manholes, frames and grates	75 ea.	235.00	180.00	200.00
25. Rectangular manholes, fr. and grates	48 ea.	245.00	130.00	210.00
26. Remove exist. drainage struct.	4 ea.	50.00	70.00	55.00
27. Change elevation of manholes	5 ea.	100.00	25.00	55.00
28. Catch basins	136 ea.	110.00	65.00	70.00
29. Septic tank	1 ea.	450.00	400.00	350.00
30. Concrete for headwalls, etc	200 c. y.	50.00	32.00	[illegible]
31. Grouted stone riprap	300 s. y.	3.50	2.00	[illegible]
32. Sod for berm protection	2,400 s. y.	.30	.45	[illegible]
33. 3-in. fiber underground ducts	9,000 l. f.	.40	.40	[illegible]
34. 8-bank, 3-in. undergr. duct	100 l. f.	3.00	2.00	[illegible]
35. Conc. for encasement (1:2:4)	200 c. y.	20.00	18.00	[illegible]
36. Electrical manholes	2 ea.	600.00	600.00	[illegible]
37. Remove exist. electr. equipment	Lump Sum	1,000.00	4,000.00	[illegible]

Schedule III—Paving

LIST OF BIDDERS:

1. F. D. Cline, Greensboro, N. C. (contract)	$702,6
2. Allegheny Asphalt & Paving Co., Pittsburgh, Pa.	963,7
3. Johnson, Drake & Piper, Inc., and Callanan Road Improvement Co., New York, N. Y.	970,6
4. Baltimore Contractors, Baltimore, Md.	1,099,3
5. Del Balso Constr. Corp., New York, N. Y.	1,125,0
6. M. DeMatteo Constr. Co., Milton, Mass.	1,317,3
7. Murphy Construction Co., Morgantown, W. Va.	2,737,3

Item	Quan	Unit Prices (1)	(2)	(3)
1. Unclassified excavation	1,000 c. y.	$0.75	$1.00	[illegible]
2. 5-in. sub-base mat'l. (Cl. III)	3,500 s. y.	.05	.40	[illegible]
3. 8-in. sub-base material (Cl. I)	173,600 s. y.	.15	.55	[illegible]
4. 9-in. sub-base material (Cl. I)	124,000 s. y.	.16	.60	[illegible]
5. 3-in. sub-base mat'l. (Cl. 1 or II)	124,000 s. y.	.04	.27	[illegible]
6. 9-in. concrete parking area	3,500 s. y.	3.00	4.25	[illegible]
7. Emulsified asph., 3-in. base crse.	669,600 gal.	.10	.11	[illegible]
8. Course aggregate, 3-in. base crse	33,480 ton	2.86	4.35	[illegible]
9. Choke aggregate, 3-in. base crse.	4,200 ton	3.00	4.35	[illegible]
10. Key stone, 3-in. base crse	5,250 ton	3.00	4.35	[illegible]
11. 6-in. dry-bound macadam	49,600 c. y.	6.20	6.30	[illegible]
12. Aggregate, 1½-in. surf. crse	20,320 ton	4.25	5.00	[illegible]
13. Bitum. material, 1½-in. surf. crse	1,380 ton	18.00	24.00	[illegible]
14. Aggregate, surf. crse	3,330 ton	4.25	5.00	[illegible]
15. Bitum. material, surf. crse	200 ton	18.00	24.00	[illegible]
16. Bitum. mat'l., seal coat	60,600 gal.	.10	.12	[illegible]
17. Cover aggregate, seal coat	1,700 ton	4.00	4.00	[illegible]

TAXIWAYS, ZANESVILLE, OHIO

OWNER: Civil Aeronautics Administration, Chicago, Ill.

PROJECT: Construction of two 75-ft. wide taxiways for the Zanesville, Ohio, Municipal Airport. Involves paving of taxiways, aprons and concrete pavement with 90,600 square yards of Class A concrete; 91,650 square yards of 5-in. granular sub-base blanket course; required liming, fertilizing and seeding; necessary 3-in. cable ducts encased in concrete (including concrete markers) in one, two and four duct banks. Alternates were allowed for concrete paving or for crushed aggregate bituminous surface course. Award made on basis of concrete pavement.

CONDITIONS: Contractor to furnish all materials and complete work in 45 days. Rail and highway transportation facilities available. Other work is being carried on by construction contractors and it is necessary for contractor on this schedule to cross over work now in progress or completed. Contractor should hold these crossings to a minimum consistent with efficient prosecution of work. Wage rates specified are: skilled labor, $1.15 to $1.625 per hour; semi-skilled, 90c. to $1.125; and common, 72½c.

PARTIAL LIST OF BIDDERS: (Concrete paving)

1. Lewis & Frisinger Co., Ann Arbor, Mich.; E. B. Schwaderer & Co., Cass City, Mich.; and Julius Porath & Sons Co., Detroit, Mich. (contract)	$292,521
2. Pierce Construction Co., Toledo, Ohio	297,188
3 Launder & Son, Inc., Toledo, Ohio	302,382

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Grading	17,000 c. y.	$0.30	$0.50	[illegible]
2. Repairing washes	500 c. y.	1.00	1.00	[illegible]
3. 5-in. granular sub-base blanket crse	91,650 s. y.	.32	.30	[illegible]
4. 9-in. uniform Class A concrete pavement, taxiway and apron	90,600 s. y.	2.50	2.58	[illegible]
5. Liming	230 ac.	10.00	10.00	20.00
6. Fertilizing	230 ac.	12.00	10.00	20.00
7. Seeding field and sideslope area with winter rye	150 ac.	8.00	12.00	15.00
8. Seeding field and sideslope areas with [seed mixture	230 ac.	20.00	30.00	20.00

(*Continued on page* 178)

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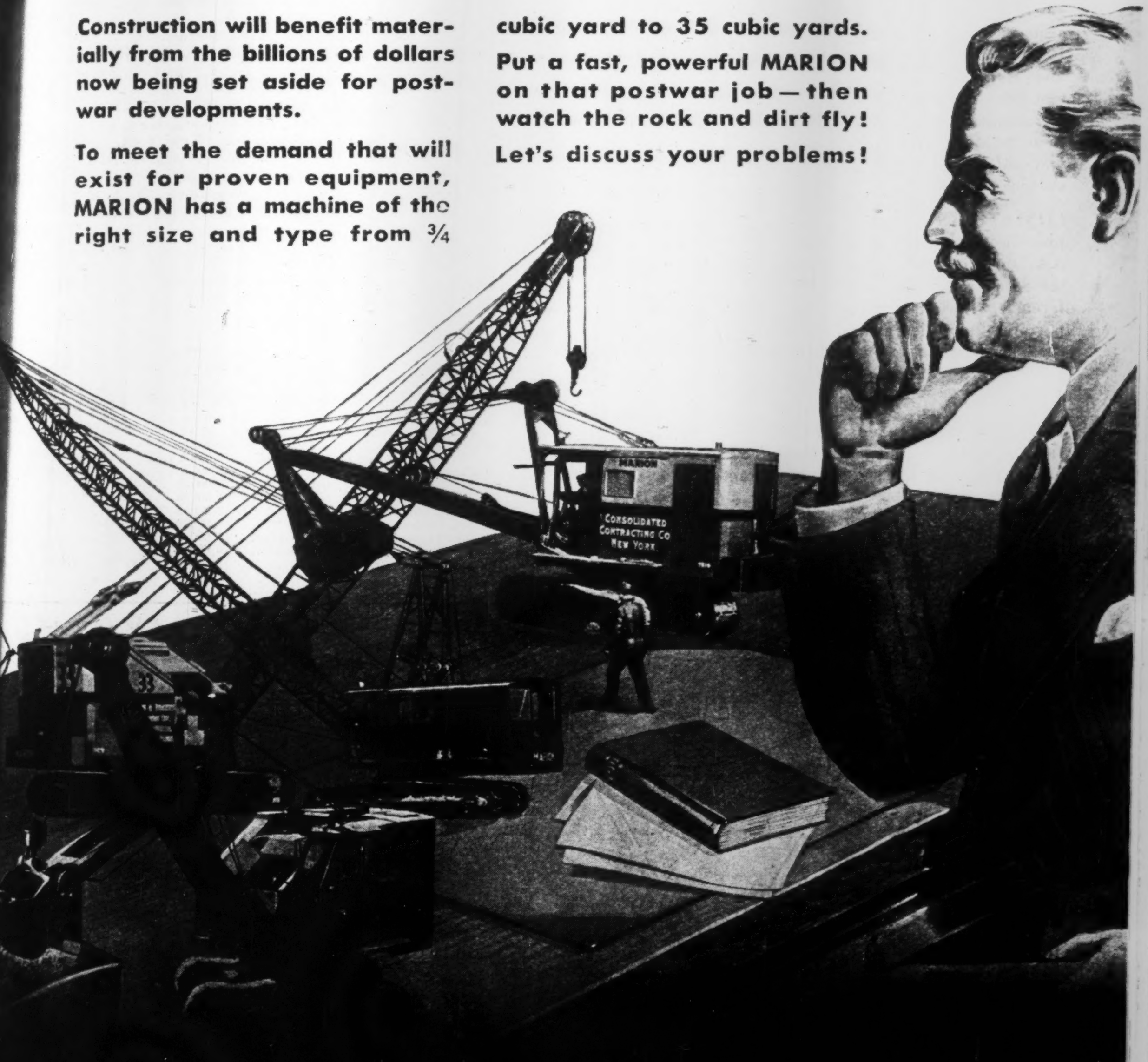
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33

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SHOVELS • DRAGLINES • CRANES • PULL-SHOVELS

CLAMSHELLS • WALKERS • *from 3/4 cu. yd. to 35 cu. yds.*

TAXIWAYS, ZANESVILLE, O. (cont'd.)

9. Straw mulch	20 ac.	200.00	125.00	100.00
10. Sodding	30,000 s. y.	.42	.30	.50
11. 3-in. cable ducts encased in conc., incl. concrete markers (1 duct bank)	160 l. f.	1.50	1.00	1.00
12. As above (two duct bank)	1,050 l. f.	2.25	1.20	1.50
13. As above (four duct bank)	80 l. f.	3.50	2.50	3.00
14. Concrete, 1:2:4 mix, for erosion protection, etc	15 c. y.	50.00	35.00	40.00

PAVING RUNWAYS, IDLEWILD AIRPORT, N. Y.

OWNER: City of New York, Dept. of Marine and Aviation; Jay Downer, consulting engineer, and Wharton Green, associate engineer.

PROJECT: Paving of runways A, B and C with cement concrete pavement of 12-in. uniform thickness. Runway A to be 10,000-ft. long by 200-ft. wide; Runway B, 7,500-ft. by 200-ft.; and Runway C, 8,200-ft. by 200-ft. It is stipulated that 600,000 sq. yd. of Runway A must be laid in 1944 season, forming full width section at least 1,000-ft. long. Grading item includes all excavation for pavement and underslabs, disposal of excavated material, forming and trimming all shoulders, maintenance, and preparation of fine grade.

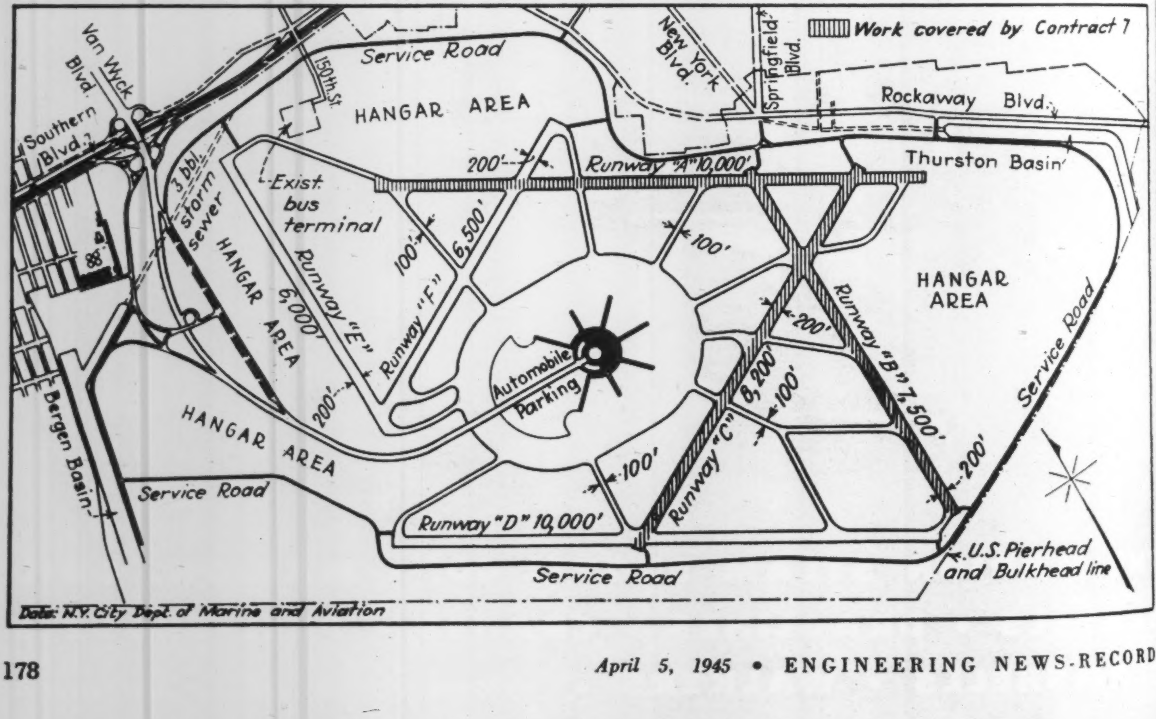
CONDITIONS: Contractor to furnish all materials and complete work in 330 consecutive calendar days. Project has AA-3 priority rating. Other contracts may be carried on at the same time, and care must be exercised to avoid interference with other work. Rail, highway and water transportation facilities available at or near site of work. Wage rates are: skilled labor, $1.60 to $2.25 per hour; semi-skilled, $1.00 to $1.62½; common, 95c.; and pipelayers (unskilled), $1.50.

BIDS: Twenty-four bids were received September 21, 1944, ranging from the contract low of $2,203,945 to $3,755,384. Estimated cost, $2,700,000. (Contract 7).

LIST OF BIDDERS:

1. A. I. Savin Constr. Co., East Hartford, Conn. (contract)	$2,203,945
2. L. G. DeFelice & Son, Inc., New Haven, and Andrew Gull, Brooklyn, N. Y.	2,229,5
3. Sicilian Asphalt Paving Co., New York, N. Y.	2,369,9
4. Arute Bros., Inc., Rochester, N. Y.	2,450,3
5. Woodcrest Constr. Co., and Gould & Kress, New York, N. Y.	2,466,2
6. Garofano Constr. Co., Inc., New York, N. Y. and Mt. Vernon Contr. Corp. Mt. Vernon, N. Y.	2,467,4
7. Del Balso Constr. Corp., and Rusciano & Son Corp., New York, N. Y.	2,473,4
8. Tully & DiNapoli, Inc., Long Island City, N. Y.	2,492,0
9. Gahagan Constr. Corp., New York, N. Y.	2,497,8
10. Grandview Co., Mount Vernon, N. Y.	2,538,6
11. Tufano Contract. Corp., Jamaica, and Charles F. Vachris, Brooklyn, N. Y.	2,539,2
12. Standard Bitulithic Co., New York, N. Y. and Warren Bros. Roads Co., Cambridge, Mass.	2,628,2
13. D. V. Frione Co., Inc., New Haven, Conn.	2,643,61
14. Union Paving Co., Philadelphia, Pa.	2,650,31
15. Arthur A. Johnson Corp. & Necaro Co., Inc., Long Island City, N. Y.	2,691,00
16. Bero Engr. & Constr. Corp., Buffalo, N. Y.	2,701,43
17. Davis Constr. Co., Hicksville, N. Y.; Edward Acker Co., Setauket, N. Y.; and Tuckahoe Constr. Co., Inc., Tuckahoe, N. Y.	2,701,76
18. Louis Mayersohn, Albany, N. Y.	2,722,57
19. B. Perini & Sons, Inc., Framingham, Mass.	2,768,96
20. Johnson, Drake & Piper, Inc., New York, N. Y.	2,777,05
21. W. L. Johnson Constr. Co. and Associates, Hicksville, Ohio	2,794,080
22. Andrew Weston Co., Inc., Woodmere, N. Y. and Good Roads Engr. & Contracting Co., Inc., Wantagh, N. Y.	2,858,80
23. Tripp Constr. Co.; Arthur Venneri Co.; and Zara Contracting Co., Hewlett, N. Y.	2,914,740
24. S. J. Groves & Sons Co., Ridgefield, N. J. and Union Building & Constr. Corp. Passaic, N. J.	3,755,384

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Grading	570,000 s. y.	$0.10	$0.10	$0.0
2. High Early Strength Portland cement	12,500 bbl.	2.73	3.15	2.8
3. Natural cement	51,000 bbl.	2.60	2.50	2.7
4. Portland cement	310,000 bbl.	2.25	2.28	2.30
5. Cement concrete pavement	190,000 c. y.	5.70	5.70	6.44
6. First class concrete (1:2:4)	350 c. y.	25.00	15.00	19.00
7 Calcium chloride	50,000 lb.	.03	.03	.11
8. Metal reinforcement for conc. pavmt	570,000 s. y.	.23	.25	.25
9. Expansion joint material	48,800 l. f.	.40	.43	.56
10. Bar reinforcement for structures	73,000 lb.	.05	.05	.06
11. Joint supports, Type A	4,000 ea.	1.20	.50	.58
12. Joint supports, Type B	4,000 ea.	2.00	1.75	1.75
13. Joint supports, Type C	4,000 ea.	1.20	1.95	1.84
14. Joint supports, Type D	4,000 ea.	1.20	.55	.54
15. Electrical conduit, 3-in. diameter	10,000 l. f.	.80	2.00	.95
16. Load tests	12 ea.	400.00	250.00	442.00



Data: N.Y. City Dept. of Marine and Aviation

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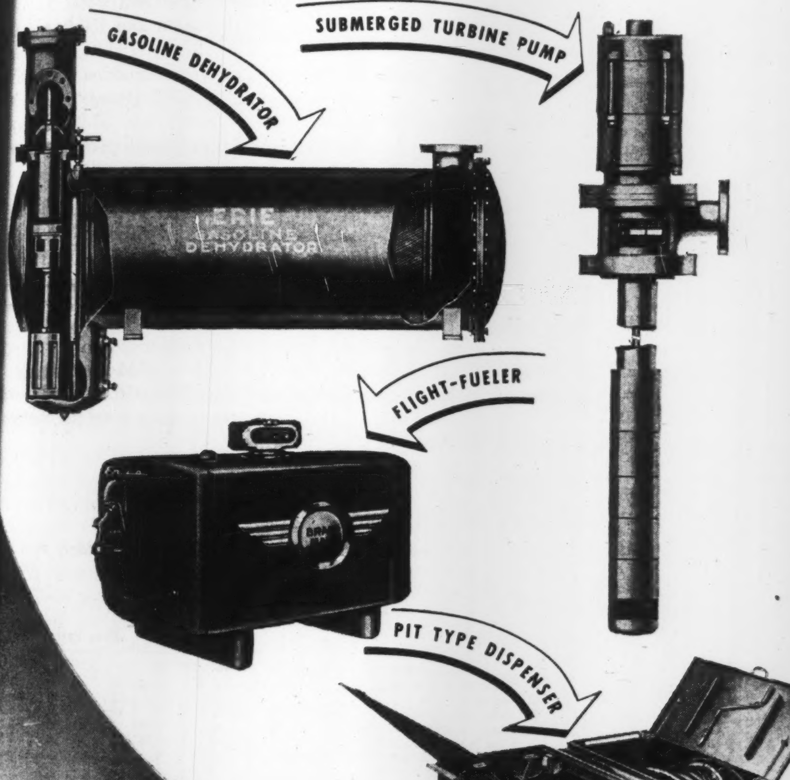

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ERIE

ERIE METER SYSTEMS, INC., *Main Office and Plant: Erie, Pa.*

AIRPORT, MERCER COUNTY NEW JERSEY

OWNER: Civil Aeronautics Administration, First Region, LaGuardia Field, N. Y.

PROJECT: Clearing, grading, draining and paving the Mercer County, N. J., Airport, consisting of the following: 250,000 c.y. of excavation necessary for grading one runway and taxiway; 8,500 l.f. of pipe for field, taxiway, runway and outfall drainage; paving one runway 3.000 ft. by 150-ft. and taxiway 1.100-ft. by 50-ft.; and other necessary work within airport limits.

CONDITIONS: Contractor will be required to furnish all necessary materials and equipment required for performance of contract except manhole frames, covers and steps, and 3,440-ft. of duct. Contract time allowed is 45 days for each schedule; seventy days if Schedules I and II are combined and awarded to one bidder. Rail and highway transportation facilities available. Wage rates stipulated are: skilled labor \$1.62½ to \$2.00 per hour; semi-skilled, 90c to \$1.37½; and common, 90c.

BIDS: Eleven bids were received March 30, 1944 on Schedule I, ranging from the low of \$214,185 to \$416.831. Engineers estimate, \$283,138. Three bids were opened on Schedule II the same day, ranging from \$129.549 to \$161,720. Engineers estimate, \$113.490. Six bids were received on Schedule III (combination of Schedules I and II) ranging from the low of \$387,460 to \$1.010.174. Engineers estimate, \$396.628.

Schedule I—Preparation of Site

LIST OF BIDDERS:

1. Peter Mitchell, Inc., Greenwich Conn., and Paul Bacco & Son, Inc., Stamford, Conn. (low bidder)	\$214,185
2. Circle Construction Co., White Plains, N. Y.	226,603
3. George M. Brewster & Son, Inc., Bogota, N. J.	246,251
4. Bedford Hills Constr. Corp., E. Hartford, Conn.	249,609
5. White Oak Excavators, Inc., Plainville, Conn.	265,150
6. S. J. Groves & Sons Co., Ridgefield, N. J.	304,275
7. A. D. Angelo & Sons, Inc., New York, N. Y.	315,750
8. Delma Engineering Corp., Bronx, N. Y.	322,130
9. Robert W. Cleveland & Co., East Orange, N. J.	333,115
10. The Grandview Co., Mt. Vernon, N. Y.	385,525
11. Lenox Construction Corp., Bronx, N. Y.	416.831

Item	Quan:	Unit Prices		
		(1)	(2)	(3)
1. Clearing and grubbing	Lump Sum	\$4,500.00	\$1,000.00	\$1,500.00
2. Grubbing	5 ac.	100.00	200.00	190.00
3. Clearing	15 ac.	150.00	75.00	325.00
4. Unclassified excavation	250,000 c. y.	.62	.74	.75
5. 8-in. cradle invert pipe	4,000 l. f.	1.00	.72	.80
6. 10-in. cradle invert pipe	660 l. f.	1.25	.84	1.00
7. 12-in. cradle invert pipe	800 l. f.	1.50	1.14	1.40
8. Unclassified excavation, drainage	2,400 c. y.	6.00	3.00	4.00
9. Compacting earth backfill	600 c. y.	1.00	1.00	1.60
10. Porous backfill	1,800 c. y.	6.00	4.50	6.50
11. 8-in. pipe, field drain	340 l. f.	1.00	.72	1.00
12. 10-in. pipe, field drain	340 l. f.	1.25	.89	1.25
13. 12-in. pipe, field drain, if needed	1,800 l. f.	1.25	1.14	1.50
14. 18-in. pipe, field drain	520 l. f.	2.50	2.21	2.75
15. Remove, relay exist. 12-in. pipe	1,800 l. f.	1.00	1.75	1.00
16. Manholes, set fr. and covers, steps	14 ea.	125.00	123.00	215.00
17. Cast iron frames and grates	10 ea.	200.00	150.00	240.00
18. Change elevation of manholes	20 ea.	40.00	40.00	20.00
19. Catchbasins	12 ea.	150.00	115.00	125.00
20. Concrete for headwalls, etc	10 c. y.	40.00	28.00	45.00
21. 8-in. grouted riprap	10 s. y.	5.00	25.00	6.00
22. 3-in. fiber underground ducts	2,900 l. f.	1.00	.82	1.60
23. Three-way 3-in. duct	180 l. f.	5.00	1.26	2.45
24. 1:2:4 conc. for encasement	75 c. y.	25.00	20.00	40.00
25. Misc. electrical work, remove exist. cable	1.000 l. f.	1.00	.20	.50
26. Remove, relocate existing lights	2 ea.	50.00	72.00	55.00
27. Change elevation of contact lights	14 ea.	30.00	68.00	70.00

Schedule II—Airport Paving

LIST OF BIDDERS:

1. Union Paving Co., Philadelphia, Pa. (low bidder)	\$129,549
2. Robert W. Cleveland & Co., East Orange, N. J.	145,206
3. Standard Bitulithic Co., New York, N. Y.	161.720

Item	Quan.	Unit Price		
		(1)	(2)	(3)
1. Unclassified excavation	500 c. y.	\$1.00	\$1.50	[illegible]
2. Sub-base material, 3-in. and variable	26,485 s. y.	.18	.16	[illegible]
3. Sub-base material, 5-in. and variable	6,605 s. y.	.24	.26	[illegible]
4. Sub-base material, 5-in. min. in rock	14,750 s. y.	.36	.35	[illegible]
5. Dry-bound macadam	600 c. y.	6.00	6.50	[illegible]
6. Bituminous prime coat	19,000 gal.	.13	.13	[illegible]
7. 7-in. dry-bound macadam	9,250 c. y.	5.50	6.00	[illegible]
8. 2-in. surf. course, tack coat	2,730 gal.	.10	.12	[illegible]
9. Aggregate, 2-in. surf. crse	2,390 ton	6.20	6.85	[illegible]
10. Bitum. mat'l., 2-in. surf. crse	145 ton	17.00	23.00	[illegible]
11. Aggregate, 2-in. surf. crse	4,400 ton	6.20	6.85	[illegible]
12. Bitum. mat'l., 2-in. surf. crse	264 ton.	17.00	23.00	[illegible]
13. Aggregate, 2½-in. surf. crse	1,080 ton	6.20	7.60	[illegible]
14. Bitum. mat'l., 2½-in. surf. crse	65 ton	17.00	23.00	[illegible]
15. Bitum. mat'l., seal coat	13.910 gal.	.10	.12	[illegible]
16. Cover aggregate, seal coat	385 ton	5.00	10.00	[illegible]

EXTENDING AIRPORT SHERIDAN, WYOMING

OWNER: Civil Aeronautics Administration, Kansas City, Mo

PROJECT: Enlarging and improving the Sheridan County Airport, Sheridan, Wyo., including necessary grading, drainage, bituminous paving, and other incidental work. NE-SW runway to be extended to 5,000-ft. length and 150-ft. width, construction of N-S runway, 5,000-ft. by 150-ft., including the required grading and drainage; reconstruction of NW-SE and NE-SW runways; extending NW-SE runway to 150-ft. by 6,000-ft.; and construction of apron and 50-ft. taxiway. Bids were asked on concrete and bituminous pavement. Contract was let on latter basis.

CONDITIONS: Contractor to furnish all materials and complete work in 92 weather working days. Highway facilities available to site of work, and rail transportation three miles northeast. Wage rates specified are: 65c. per hour for common building labor; and 65c. for common labor on heavy construction.

BIDS: Four bids were received June 5, 1944 on Schedule 1 (concrete), ranging from \$618,382 to \$974,956. Six bids were opened on Schedule 2 (bituminous) ranging from the contract low of \$480.846 to \$745.802.

Schedule 1—Concrete Paving

LIST OF BIDDERS: (No award on this basis)

1. Peter Kiewit Son's Co., Sheridan, Wyo. (low bidder)	\$618,382
2. Northwestern Engr. Co., Rapid City, S. Dak.	768,399
3. Western Contracting Corp., Sioux City, Iowa	877,339
4. J. L. McLaughlin, Great Falls, Mont.	974,956

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Unclassified excavation	227,600 c. y.	\$0.20	\$0.25	\$0.41
2. 8-in. drain pipe	2,762 l. f.	1.33	1.40	[illegible]
3. 10-in. drain pipe	574 l. f.	1.49	2.20	[illegible]
4. Type A manhole, complete	11 ea.	86.10	150.00	300.00
5. Type B manhole, complete	1 ea.	145.95	225.00	600.00
6. Adjust present manholes to grade (Max. 1-ft.)	11 ea.	43.05	40.00	45.00
7. Structural concrete	20 c. y.	33.81	30.00	35.00
8. Reinforcing steel	1,000 lb.	.08	.12	[illegible]
9. Granular sub-base material	44,950 c. y.	1.03	1.00	[illegible]
10. 8-in. uniform concrete pavement	132,256 s. y.	2.19	2.70	[illegible]
11. 9-in. uniform concrete pavement	97,873 c. y.	2.29	2.90	[illegible]
12. MC-3 cutback asphalt (alternate)	90 ton	19.79	28.00	23.00
13. Bituminous mixture	1,245 ton	1.38	5.00	6.00
14. Asphaltic cement (alternate)	70 ton	151.17	25.00	22.00
15. RC-2 asphalt, tack or seal coat	9 ton	19.79	30.00	25.00
16. Sand for seal coat (alternate)	64 ton	2.40	4.00	3.10
17. Crushed aggregate for seal coat (alt.)	64 ton	2.73	5.00	3.10
18. 3-in. underground duct, first run in trench	4,960 l. f.	.42	1.00	[illegible]
19. 3-in. underground duct, add'l. runs	8,000 l. f.	.35	.50	[illegible]

Schedule 2—Bituminous Paving

LIST OF BIDDERS: (Crushed aggregate alternate)

1. Peter Kiewit Son's Co., Sheridan, Wyo. (contract)	\$480,846
2. Northwestern Engr. Co., Rapid City, S. Dak	551,321
3. Inland Constr. Co., Omaha, Nebr.	591,898
4. J. L. McLaughlin, Great Falls, Mont.	680,490

(*Continued on page* 181)

EXTENDING AIRPORT SHERIDAN, WYOMING (cont'd.)

Schroeder & Co., Inc., Roscoe, Calif., and B. W. Hampton Co., Inc., Santa Ana, Calif.	704,707
6. Brown Construction Co., Pueblo, Colo.	745,802

Item	Quan.	Unit Prices (1)	(2)	(3)
Unclassified excavation	227,600 c. y.	$0.20	$0.25	$0.24
8-in. drain pipe	2,762 l. f.	1.33	1.40	1.30
10-in. drain pipe	574 l. f	1.49	2.20	1.60
Type A manhole, complete	11 ea.	86.10	150.00	165.00
Type B manhole, complete	1 ea.	145.95	225.00	230.00
Adjust present manholes to grade	11 ea.	43.05	40.00	62.50
Structural concrete	20 c. y.	33.81	30.00	62.50
Reinforcing steel	1,000 lb.	.08	.12	.10
Granular sub-base material	162,500 c. y.	.95	.95	.95
MC-1 asphalt for prime coat	136 ton	18.88	24.00	20.80
Bituminous mixture, base	61,800 ton	1.97	2.52	2.85
Bituminous mixture, surface	22,800 ton	2.25	2.70	3.00
Bituminous mixture, special surface	3,060 ton	2.47	3.00	5.00
Asphaltic cement	4,500 ton	16.00	16.50	19.30
Asphalt for tack coat	288 ton	18.88	25.00	21.40
Asphalt for seal coat	190 ton	19.58	25.00	21.40
Sand for seal (alternate)	1,790 ton	2.40	3.50	3.60
Crushed aggregate for seal (alternate)	1,790 ton	2.73	3.90	3.60
3-in. underground duct, first run	4,960 l. f.	.42	1.00	.75
3-in. underground ducts, add'l runs	8,000 l. f.	.35	.50	55

AIRPORT, DULUTH, MINN.

OWNER: Civil Aeronautics Administration, Chicago. I. H. Polk, engineer.

PROJECT: Enlarging Williamson-Johnson Airport, Duluth, Minn., including repairing and resurfacing existing runways, and extending two runways, taxiways and aprons. Involves all necessary excavation; drainage structures; fertilizing and seeding; fencing; preparation of base course; and surfacing. Alternates were allowed on the runway extension and taxiways: Alternate A—asphalt on lean-mix rolled concrete base with granular sub-base; and Alternate B—asphalt on crushed aggregate base and granular sub-base. Award made on latter basis.

CONDITIONS: Contractor to furnish all materials and complete work in 120 calendar days. Rail, highway and water transportation facilities available. Work necessitates rehabilitation of existing airport; disintegrating portions of soil cement runways; patching and repatching with lean-mix concrete; and resurfacing with new bituminous surface binding; 6-in. soil cement base in place; 6-in. lean-mix concrete base will be placed over whole bituminous binder. Wage rates are: skilled labor, $1.25 to $1.625 per hour; semi-skilled, 87½c. to $1.25; and common labor, 77½c.

BIDS: Six bids were received March 29, 1944, ranging from the contract low of $780,469 to $1,079,866 on basis of Alternate B; and five bids ranging from the low of $821.611 to $1,152,875 on Alternate A.

LIST OF BIDDERS: (Alternate A)

1. Wilmer Pierson, Dearborn, Mich.	$821,611
2. G. W. Haggart Co., Fargo, N. D.	849,158
3. Megarry Bros., St. Cloud, Minn.	891,451
4. Jay W. Craig Co., Minneapolis, Minn.	1,002,252
5. S. J. Grove & Sons Co., Minneapolis, Minn.	1,152,875

LIST OF BIDDERS: (Alternate B)

1. Wilmer Pierson, Dearborn, Mich. (contract)	$780,469
2. Megarry Bros., St. Cloud, Minn.	853,397
3. Jay W. Craig Co., Minneapolis, Minn.	955,750
4. George D. Alexander, Minneapolis, Minn.	962,106
5. S. J. Grove & Sons Co., Minneapolis, Minn.	1,057,421
6. Fielding & Shepley, Inc., St. Paul, Minn.	1,079,866

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear and grub, within limits	Lump Sum	$1,400.00	$1,600.00	$2,750.00
2. Clearing Areas 1 and 2	Lump Sum	1,000.00	800.00	1,100.00
3. Clearing trees outside limits	100 in. dia.	1.00	.25	.60
4. Remove fence outside limits	100 rod	.50	.25	.60
5. Grading	572,000 c. y.	.20	.195	.27
6. Marsh excavation	36,000 c. y.	.27	.50	.50
7. Rock excavation	1,000 c. y.	5.00	2.50	3.50
8. Remove, clean and store sewer and culvert pipe, to 10-in.	3,840 l. f.	1.10	.80	.75
9. As above, 12 to 21-in	3,860 l. f.	1.40	1.10	.85
10. As above, over 21-in.	400 l. f.	1.85	1.50	1.00
11. Open ditch excavation	3,000 c. y.	.20	.50	.50
12. Rock excavation for trenches	200 c. y.	5.00	10.00	10.00
13. Install salvaged sewer and culv. 8-in	1,025 l. f.	.60	.85	.50
14. As above, 10-in	3,905 l. f.	.80	1.00	.60
15. As above, 15-in	975 l. f.	1.00	1.15	.75
16. 6-in. open joint underdrains	660 l. f.	.60	.85	.75
17. 8-in. open joint underdrains	1,300 l. f.	.70	1.05	.80
18. 10-in. open joint underdrains	260 l. f.	1.25	1.15	1.00
19. Remove, clean and replace underdrain pipe, 8 to 10-in	1,800 l. f.	1.20	.95	.75
20. As above, 12 to 15-in	1,200 l. f.	1.40	1.25	1.00
21. Open joint underdrain installed in French drains, 6-in	29,700 l. f.	.25	.45	.35
22. Granular backfill for underdrains	4,470 c. y.	1.35	.65	1.00
23. Granular backfill when pipe not removed (incl. excav.)	5,750 c. y.	1.50	1.40	1.60
24. Granular backfill for French drains (incl. excav.)	6,600 c. y.	1.95	1.50	1.60
25. Remove and reinstall 8-in. sewer pipe	200 l. f.	1.50	1.60	2.00
26. 12-in. storm sewer pipe	1,600 l. f.	2.20	1.95	2.10
27. 15-in. storm sewer pipe	970 l. f.	2.70	2.40	2.50
28. 21-in. storm sewer pipe	505 l. f.	4.00	3.95	4.25
29. 18-in. storm sewer pipe	700 l. f.	3.30	2.90	3.00
30. 42-in. storm sewer pipe	645 l. f.	9.95	10.30	10.25
31. 15-in. storm sewer pipe	80 l. f.	2.70	2.40	2.40
32. 18-in. storm sewer pipe	677 l. f.	3.30	2.90	3.10
33. 24-in. storm sewer pipe	670 l. f.	4.50	4.45	4.40
34. 30-in. storm sewer pipe	2,615 l. f.	6.30	6.25	6.00
35. 36-in. storm sewer pipe	315 l. f.	7.70	8.00	8.25
36. 24-in. extra str. sewer pipe	210 l. f.	4.70	4.60	4.25
37. 36-in. extra str. sewer pipe	465 l. f.	8.55	8.85	9.10
38. 42-in. extra str. sewer pipe	120 l. f.	11.15	11.50	11.25
39. 21-in. triple str. conc. sew. pipe.	2,188 l. f.	4.10	3.95	4.00
40. Type A manholes	34 ea.	125.00	140.00	140.00
41. Concrete for inlets, headwalls and drainage structures	150 c. y.	30.00	40.00	42.00
42. Reinforcing steel	657 lb.	.10	.10	.10
43. 30-in. concrete grate bars	541 ea.	2.00	.75	2.25
44. Raising manholes and inlets	23 ea.	10.00	10.00	15.00
45. Lowering manholes, 1-ft. or less	10 ea.	10.10	6.00	15.00
46. Lowering manholes, more than 1-ft	3 ea.	25.00	10.00	30.00
47. Abandoning manholes and inlets	12 ea.	10.00	25.00	10.00
48. Convert manholes	1 ea.	40.00	60.00	55.00
49. Convert inlet to manhole	1 ea.	50.00	25.00	50.00
50. Remove manhole	1 ea.	50.00	20.00	25.00
51. 6-in. riprap or concrete flumes	180 s. y.	2.50	3.50	4.00
52. Fertilizing	230 ac.	12.00	10.00	12.00
53. Seeding rye	230 ac.	2.50	2.50	4.00
54. Seeding mixture	230 ac.	12.00	10.00	16.00
55. Sodding	32,000 s. y.	.30	.27	.40
56. Brushing fence lines	200 rod	.50	1.00	1.00
57. Clearing trees on line	400 rod	.50	1.50	1.25
58. Class C fence	1,520 rod	2.50	4.50	4.00
59. Bench and runway markers	12 ea.	8.00	15.00	6.00
60. Driveway and parking area surf. mat'l	730 c. y.	2.50	2.15	1.00
61. 3-in. underground ducts, 2-bank	3,220 l. f.	2.00	1.80	2.00
62. 3-in. underground ducts, 3-bank	232 l. f.	2.50	2.55	3.00
63. 3-in. underground ducts, 4-bank	445 l. f.	3.00	3.00	4.00
64. 3-in. underground ducts, 6-bank	580 l. f.	4.00	5.00	5.00
65. 3-in. underground ducts, 10-bank	58 l. f.	8.00	6.50	8.00
66. 8-in. granular sub-base, conc. apron	4,390 s. y.	.30	.40	.35
67. 9-in. uniform Class A spec. conc.	4,108 s. y.	4.00	3.50	3.50
68. Remove soil cement; repairing base	35,000 s. y.	.05	.12	.17
69. Replace subgrade; repairing base	2,000 c. y.	.60	1.20	.80
70. 8-in. gran. sub-base; repairing base	3,000 s. y.	.30	.40	.45
71. 6-in. lean-mix conc.; repairing base	35,000 s. y.	.50	.60	.60
72. Portland cement for Item 71	5,100 bbl.	2.21	2.60	2.60
73. RT-2 or RT-3 prime	34,000 gal.	.125	.13	.12
74. MC-1 in lieu of tar for prime	——— gal.	.125	.105	.10
75. Hot-mix leveling course	20,000 ton	2.10	2.05	2.75
76. 2-in. hot-mix binder, 100% crushed	20,200 ton	2.68	4.02	3.00
77. 1-in. hot-mix surf., 40% crushed	9,550 ton	3.83	2.65	3.00
78. 1½-in. hot-mix surf., 100% crushed	820 ton	3.83	4.02	4.00
79. Asphalt cement, 120–150 penetr	655,000 gal.	.095	.075	.08
80. Emul. asph. tack coat	38,180 gal.	.125	.11	.11
81. RC-2 seal coat	38,180 gal.	.125	.10	.095
82. Seal coat aggregate	1,430 ton	7.00	6.80	6.00

Alternate A—Asphalt on Lean-Mix Rolled Concrete Base

Item	Quan.	(1)	(2)	(3)
83. 8-in. granular sub-base	31,700 s. y.	.30	.40	.35
84. 11-in. granular sub-base	109,000 s. y.	.41	.50	.48
85. 6-in. lean-mix conc. base course	138,820 s. y.	.50	.60	.55
86. Cement for Item 85	20,200 bbl.	2.21	2.60	2.60
87. 2-in. surf. crse., hot-mix, 40% crushed	12,300 ton	3.83	2.65	3.00
88. 2½-in. surf. crse., hot-mix, 100% crushed	3,000 ton	3.83	4.02	4.25
89. Asphalt cement, 120–150 penetr	230,000 gal.	.095	.075	.08
90. Emul. asphalt tack coat	3,000 gal.	.125	.11	.11
91. RC-2 seal coat	30,500 gal.	.125	.10	.10
92. Seal coat aggregate	1,000 ton	7.00	6.80	6.00

(Continued on page 182)

AIRPORT, DULUTH, MINN. (cont'd.)

Alternate B—Asphalt on Crushed Aggregate Base

93. 8-in. granular sub-base	31,700 s. y.	.30	No Bid	.35
94. 11-in. granular sub-base	109,000 s. y.	.41	No Bid	.48
95. 9-in. crushed aggregate base course	138,200 s. y.	.50	No Bid	.63
96. RT-2 or RT-3 prime	28,000 gal.	.125	No Bid	.12
97. MC-1 in lieu of tar in prime	——— gal.	.125	No. Bid	.10
98. 2-in. hot-mix surf. course, 40% crushed	12,300 ton	3.83	No Bid	3.00
99. 2½-in. hot-mix. surf. crse, 100% crushed	3,000 ton	3.83	No Bid	4.25
100. Asphalt cement, 120–150 penetr	230,000 gal.	.095	No Bid	.08
101. Emul. asphalt tack coat	3,000 gal.	.125	No Bid	.11
102. RC-2 seal coat	30,500 gal.	.125	No Bid	.10
103. Seal coat aggregate	1,000 ton	7.00	No Bid	6.00

AIRPORT, ROCK COUNTY, WIS.

OWNER: Civil Aeronautics Administration, Third Region, Chicago, Ill.; A. W. Carlson, engineer.

PROJECT: Grading, drainage, and paving at Rock County Airport, Janesville, Wis. Grading and drainage (Part II, Schedule I) involves clearing and grubbing, removal of fence, clean-up of building sites, 604,200 c.y. of grading, installation of storm sewers, fertilizing, seeding, sodding, and 3-in. underground ducts encased in concrete. Paving (Part I), included minor grading and drainage structures, painting runway numbers, fertilizing, seeding and fencing in addition to actual paving work. Alternates were allowed for paving as follows: (Schedule I) 7-in. non-reinforced Class A concrete pavement; (Schedule II) bituminous paving, including waterbound macadam base course and special bituminous surfacing for apron and ends of runways and taxiways; (Schedule III) bituminous paving for runways and taxiways exclusive of apron and ends of runways and taxiways, with waterbound macadam base course, and concrete paving of apron and ends or runways and taxiways; (Schedule IV) bituminous pavement with emulsified asphalt base course; and (Schedule V) bituminous pavement for runways and taxiways, with emulsified asphalt base course, and concrete paving of apron and ends of runways and taxiways. Award made on basis of Schedule II, and tabulations shown below for paving are for Schedules I and II.

CONDITIONS: Contractor to furnish all materials and complete work on Part II in 120 calendar days, and on Part I in 120 days. Rail and highway transportation facilities available. Wage rates are skilled labor, $1.25 to $1.75 per hour; semiskilled, 90c. to $1.25; and common, 80c.

BIDS: Fourteen bids were received on Sept. 28, 1943 for the grading and drainage contract, ranging from the contract low of $158,167 to $325,825. Thirty-seven bids were received Nov. 8, 1943 on all paving alternates (six on Schedule II) ranging from the contract low of $482,774 to $831,323.

Part II—Schedule I, Grading and Drainage

LIST OF BIDDERS: (Bids Received Sept. 28, 1943)

1. Raemisch & Madden, Middleton, Wis. (contract)	$158,167
2. Johnson-Greene Co., Ann Arbor, Mich	171,369
3. Nelson, Mullen & Nelson, Inc., Minneapolis, Minn	186,941
4. Bonness, Inc., & Bloomer Co., Milwaukee, Wis	190,074
5. A.G.T. Associates, Eau Claire, Wis	203,775
6. Central Engr'g. Co., Davenport, Iowa	206,163
7. P. W. Ryan Sons, Janesville, Wis	218,893
8. T. M. White Co., Chicago, Ill	219,535
9. A. B. Lynch Co., Milwaukee, Wis	226,202
10. Thomas McQueen Co., Forest Park, Ill	238,042
11. S. J. Groves & Sons Co., Minneapolis, Minn	283,038
12. Burch Constr. Co., Madison, Wis	287,980
13. Frank Mashuda Co., Milwaukee, Wis	306,955
14. Oliver, Engelhart & McFadden, Madison, Wis	325,825

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clear. and grub., inside grading limits	Lump Sum	$500.00	$1,500.00	$750.00
2 Clear. and grub, outside grading limits	1,500 in dia.	.25	.50	[illegible]
3. Clearing trees outside grading limits	500 in dia.	.15	.40	.40
4. Remove fence, outside grad. limits.	500 rods	.20	.60	.40
5. Clean up building sides	Lump Sum	300.00	400.00	500.00
6. Grading	604,200 c. y.	.21	.22	.24
7. 15-in. storm sewer, extr. str., std. str., or triple strength	253 l. f.	2.50	2.75	2.70
8. 15-in. storm sewer, extr. str. or triple strength, concrete	575 l. f.	3.00	2.50	2.90
9. 18-in. storm sewer, extr. str., std. str. or triple strength	430 l. f.	4.00	3.40	3.50
10. 24-in. storm sew. (C76) ext. str.	212 l. f.	5.00	5.00	4.25
11. Concrete for sewer inlets, headwalls	24 c. y.	40.00	40.00	55.00
12. Drywell structures, in place	34 ea.	135.00	100.00	150.00
13. Modify existing drywells	19 ea.	30.00	20.00	50.00
14. Reinforcing steel, drainage struct.	1,740 lb.	.10	.10	.08
15. 30-in. grate bar units	458 ea.	1.50	2.50	2.00
16. Fill existing drywells	9 ea.	15.00	10.00	10.00
17. Smooth field areas outside grading limits	150 ac.	10.00	15.00	20.00
18. Fertilizing	480 ac.	7.50	10.00	12.00
19. Seed field with oats	480 ac.	5.00	7.00	4.00
20. Seed field with grass seed mixture	480 ac.	8.50	8.00	9.00
21. Sodding	570 s. y.	.50	.50	.50
22. 3-in. underground ducts, encased in concrete, one-duct bank	4,048 l. f.	.90	1.50	1.25
23. As above, two-duct bank	1,352 l. f.	1.40	2.50	1.75
24. As above, four-duct bank	56 l. f.	2.00	4.00	2.25
25. As above, six-duct bank	56 l. f.	3.00	5.00	4.00

Part I—Schedule II, Paving

LIST OF BIDDERS: (Bids Opened Nov. 8, 1943) Award made on this schedule.

1. Rock Road Constr. Co., Chicago, Ill. (contract)	$482,774
2. J. Rasmussen & Sons, Oshkosh, Wis.	521,700
3. Payne & Dolan, Milwaukee, Wis	548,659
4. Fielding Shepley, Inc., St. Paul, Minn	572,823
5. Barber Equip. Co., Chicago, Ill	638,307
6. H. G. Goelitz, Chicago, Ill	831,323

Item	Quan.	Unit Prices (1)	(2)	(4)*
1. Misc. grading, as ordered max. haul 1,500 ft.)	500 c. y.	$0.60	$0.40	$0.60
2. Installing french drains	10,000 c. y.	1.50	1.75	.75
3. Duct markers in place	104 ea.	2.00	1.00	1.50
4. Paint runway numbers (incl. paint)	Lump Sum	300.00	400.00	1,500.00
5. Fertilizing	35 ac.	10.00	10.00	20.00
6. Seeding (oats)	35 ac.	10.00	8.00	50.00
7. Seeding (grass seed mixture)	35 ac.	10.00	12.00	50.00
8. Fencing (Class C, woven and barbed wire, wood posts; two 12-ft. gates)	1,365 rod	3.00	3.00	4.00
9. 8-in. stabilized gravel sub-base course	339,508 s. y.	.40	.465	.39
10. 4-in. waterbound macadam base course	337,952 s. y.	.44	.435	.65
11. Prime coat, applied	135,200 gal.	.09	.096	.085
12. 2-in. central plant hot-mix bitu. surf. crse. (runways and taxiways)	31,200 ton	2.90	2.93	3.30
13. Spec. bitum. surf. for apron and ends of runways and taxiways	6,200 ton	3.25	3.52	4.45
14. Asphalt cement for Items 12 and 13	506,000 gal.	.075	.097	.09
15. AC tack coat on first bitum. surf. crse. runway and taxiway ends	5,900 gal.	.10	.10	.10
16. RC-2 for seal coat, applied	84,100 gal.	.10	.099	.09
17. Seal coat aggregate, in place	3,365 gal.	2.25	2.75	1.75

* *No unit bid prices available for third low bidder: Fielding Shepley, Inc., (fourth low) prices shown.*

Part I—Schedule I, Paving (Concrete)

LIST OF BIDDERS: (No Award on This Basis)

1. Arcole Midwest Corp., Chicago, Ill.	$509,162
2. Joseph D. Bonness, Milwaukee, Wis.	535,689
3. A. G. T. Associates, Racine, Wis	562,627
4. I. D. Lain, Bloomington, Ill	569,177
5. Fielding Shepley, Inc., St. Paul, Minn	574,169

Item	Quan.	Unit Prices (1)	(5)*	(3)
1. Misc. grading, as ordered (max. haul 1,500 ft.)	500 c. y.	$1.00	$0.60	....
2. French drain installation	10,000 c. y.	.60	.75	....
3. Duct markers in place (ducts installed under previous contract)	104 ea.	1.00	1.50	....
4. Runways numbers painted, including furnishing paint	Lump Sum	1,100.00	1,500.00	....
5. Fertilizing	35 ac.	14.00	20.00	....
6. Seeding, oats	35 ac.	6.50	50.00	....
N. Seeding, specified grass seed mixture	35 ac.	12.50	50.00	....
8. Fencing, Class C (woven and barbed wire, wood posts), 2 12-ft. gates	1,365 rods	4.25	4.00	....
9. 7-in. non-reinforced Class A concrete pavement	336,396 s. y.	1.47	1.65	....

* *No unit prices shown for second, third and fourth bidders on concrete paving. Fielding Shepley, Inc., was fifth low bidder.*

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STREET IMPROVEMENTS, CINCINNATI

OWNER: Cincinnati Dept. of Public Works, H. H. Kranz, city engineer.

PROJECT: Improvement of Merlin Avenue in Cincinnati, from Plainville Road to 379.94 feet west of Marietta Street, by grading; installing 15-in. sewer of concrete pipe in Merwin Avenue from Blaney Avenue to 185 feet east; installing 18-in. sewer outlet of concrete pipe in Blaney Avenue from Merwin Avenue to Britton Avenue; installing 12-in. sewer outlets of concrete pipe in Marietta Street from Merwin Avenue to Windward Street and from the west terminus of Merlin Avenue to 140 feet west; installing other necessary drains and inlets; making necessary changes in and additions to water distribution system; installing sewer and water house services within street lines where necessary; laying cement walks; and constructing 24-ft. concrete roadway having concrete curbs integral with pavement.

CONDITIONS: Contractor to furnish all materials except cast iron pipe, fire hydrants, service pipe and fittings, and curb boxes. Alternates were allowed for pipe sewers, concrete or vitrified. Contract awarded on basis of concrete sewers. Rail and highway transportation facilities available. Cincinnati wage rates are: skilled labor, $1.45 to $1.75 per hour; and common, 85c.

BIDS: Six bids were received January 25, 1944, ranging from the contract low of $27,418 to $39,968. Engineer's estimate, $29,780.

LIST OF BIDDERS:

1. Murdock Constr. Co. and S. A. Ruebel & Co., Norwood, Ohio	$27,418
2. A. F. Jelen & Sons, Cleves, Ohio	28,201
3. O'Connell & Sweeney, Inc., Cincinnati, Ohio	29,678
4. DeSalvo Constr. Co., Cincinnati, Ohio (vitr. pipe)	29,706
5. W. L. Harper Co., Cincinnati, Ohio	30,377
6. Crumley, Jones & Crumley Co., Cincinnati (conc. pipe)	39,645
(vitr. pipe.)	39,968

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Grading, excavation	4,200 c. y.	$0.38	$0.45	$0.50
2. Removing trees	5 s. f.	15.00	5.00	5.00
3. Hauling old materials	700 c. y.	.35	.60	.50
4. Sodding	2,800 s. y.	.23	.23	.25
5. Concrete pavement, 8-in.	4,850 s. y.	2.52	2.50	2.70
6. Macadam pavement base course	650 s. y.	.65	.55	.75
7. Concrete curbs	25 l. f.	1.25	1.00	1.00
8. Integral conc. curbs, rolling	3,200 l. f.	.30	.30	.30
9. Cement walks	7,000 s. f.	.22	.22	.25
10. Concrete driveways	4,300 s. f.	.28	.28	.30
11. Concrete masonry mix (1:6)	4 c. y.	18.00	15.00	18.00
12. Form and finishing steps	80 l. f.	1.50	1.00	1.00
13. Standard manholes	4 ea.	120.00	120.00	120.00
14. Manholes readjusted	9 ea.	20.00	10.00	10.00
15. Inlets, single grate	3 ea.	27.00	40.00	27.50
16. Inlets, double grate	10 ea.	45.00	50.00	40.00
17. Hauling sewer castings	10 ton	4.00	4.00	5.00
18. Brick masonry	33 c. y.	15.00	30.00	25.00
19. House drains	400 l. f.	.90	1.00	1.00
20. Lay 6-in. c. i. pipe, valves and special castings	202 l. f.	.80	1.00	1.00
21. Install 6-in. valves on exist. mains	2 ea.	20.00	15.00	10.00
22. Haul and set 6-in. fire hydrants	2 ea.	25.00	20.00	10.00
23. Plug exist. 6-in. tees and mains	1 ea.	5.00	6.00	10.00
24. Lower existing 6-in. water main	1,200 l. f.	.75	.65	.60
25. Lower exist 3-in. to 2-in. service branches	1,050 l. f.	.75	.65	.75
26. Haul and install ¾-in. serv. pipe and fittings	180 l. f.	.60	.40	.40
27. Haul and install curb boxes	7 ea.	1.00	2.00	1.00
28. Reset existing curb boxes	41 ea.	1.00	1.00	1.00
29. Brick masonry for valve chambers	10 c. y.	32.50	30.00	30.00
30. Concrete masonry for valve chambers	6 ton	12.00	15.00	15.00
31. Wiping joints	28 ea.	4.00	3.00	3.00
32. 12-in. conc. pipe sewers	425 l. f.	1.00	2.25	2.50
33. 15-in. conc. pipe sewers	220 l. f.	3.00	3.50	3.75
34. 18-in. conc. pipe sewers	270 l. f.	4.90	5.00	5.00
35. Concrete inlet connection, 12-in.	380 l. f.	1.85	2.00	2.00
36. T-branches on 12-in. conc. pipe	5 ea.	1.25	1.20	1.20
37. T-branches on 15-in. conc. pipe	10 ea.	1.50	2.00	1.70
38. T-branches on 18-in. conc. pipe	5 ea.	2.50	2.50	2.20
39. Concrete bends, 6-in	40 ea.	.90	1.00	1.00
40. 12-in. vitr. pipe sewers (alt.)	425 l. f.	......	2.50	......
41. 15-in. vitr. pipe sewers (alt.)	220 l. f.	......	3.90	......
42. 18-in. vitr. pipe sewers (alt.)	270 l. f.	......	5.50	......
43. Vitr. inlet connection, 12-in. (alt.)	380 l. f.	......	2.25	......
44. T-branches on 12-in. vitr. pipe (alt.)	5 ea.	......	1.70	......
45. T-branches on 15-in. vitr. pipe (alt.)	10 ea.	......	2.75	......
46. T-branches on 18-in. vitr. pipe (alt.)	5 ea.	......	3.50	......
47. Vitrified bends, 6-in. (alt.)	40 ea.	......	1.00	......
48. Haul waterworks castings	6 ton	2.00	4.00	3.50

DARKENED CONCRETE ROADWAY PAVEMENT, WASHINGTON, D. C.

OWNER: District Commissioners, Washington, D. C.

PROJECT: Approximately 2,650 sq.yd. of darkened concret roadway pavement, concrete curbing, and gutter repairs o west roadway of South Capitol Street, between Howard Road and Portland Street, Washington, D. C.

CONDITIONS: Contractor to furnish all materials and complete project by August 1, 1944. Highway transportation facilities available to site of work. Wage rates specified are: skilled labor, $1.25 to $1.50 per hour; semi-skilled, 80c. to $1.00; and common labor, 75c.

BIDS: Five bids were received April 27, 1944, ranging from the contract low of $15,755 to $19,456.

LIST OF BIDDERS:

1. Wilmoth Paving Co., Washington, D. C. (contract)	$15,755
2. E. B. Donaldson & Brother, Washington, D. C	16,949
3. Donaldson Paving Co., Inc., Washington, D. C	17,553
4. Corson & Gruman Co., Washington, D. C	18,943
5. McGuire & Rolfe, Washington, D. C	19,456

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Bituminous surface course (CM-B)	10 ton	$10.00	$12.00	$9.0
2. Wire mesh reinforcement	3,000 s. y.	.25	.24	.2
3. Adjusting District manhole frames	5 ea.	5.00	3.00	5.0
4. Cutting blocks, cement roadway, sidewalks, etc	1,000 l. f.	.50	.40	.7
5. Borrow excavation	250 c. y.	1.00	1.00	2.0
6. Calcium chloride	100 lb.	.02	.03	.0
7. Cork expansion joint	100 l. f.	.50	.40	.8
8. Cement concrete pavement	5 c. y.	12.50	19.75	15.0
9. Anchor bolts	350 ea.	.40	1.50	.5
10. Carbon emulsion	50 lb.	.10	.10	.2
11. Darkened cement concrete for roadway pavement	2,650 s. y.	3.75	4.40	4.0
12. Darkened cem. conc. for curbway	5 c. y.	16.00	20 00	16.0
13. Cement for curbing and gutter	2,250 l. f.	1.65	1.25	1.2
14. ⅜-in. deformed tie rods	2,000 lb.	.07	.10	.0

SHEET ASPHALT PAVING BOSTON, MASS.

OWNER: Public Works Department, Boston, Mass.

PROJECT: Sheet asphalt paving Rutherford Avenue, Ward 2, from Chapman Street to Cambridge Street, Boston, Mass. Involves 19,500 sq.yd. of sheet asphalt paving of 3-in. depth, laid in two courses (1½-in. binder course and 1½-in. surface course) over 4 to 6-in. cement concrete base.

CONDITIONS: Contractor to furnish all materials and complete work by Nov. 30, 1944. Highway transportation facilities available. One-half of the heavily traveled roadway must be kept open for traffic at all times. Wage rates are: skilled labor, $1.37½ to $1.87½ per hour; semi-skilled, 77c. to $1.30; and unskilled labor 50c. to $1.00.

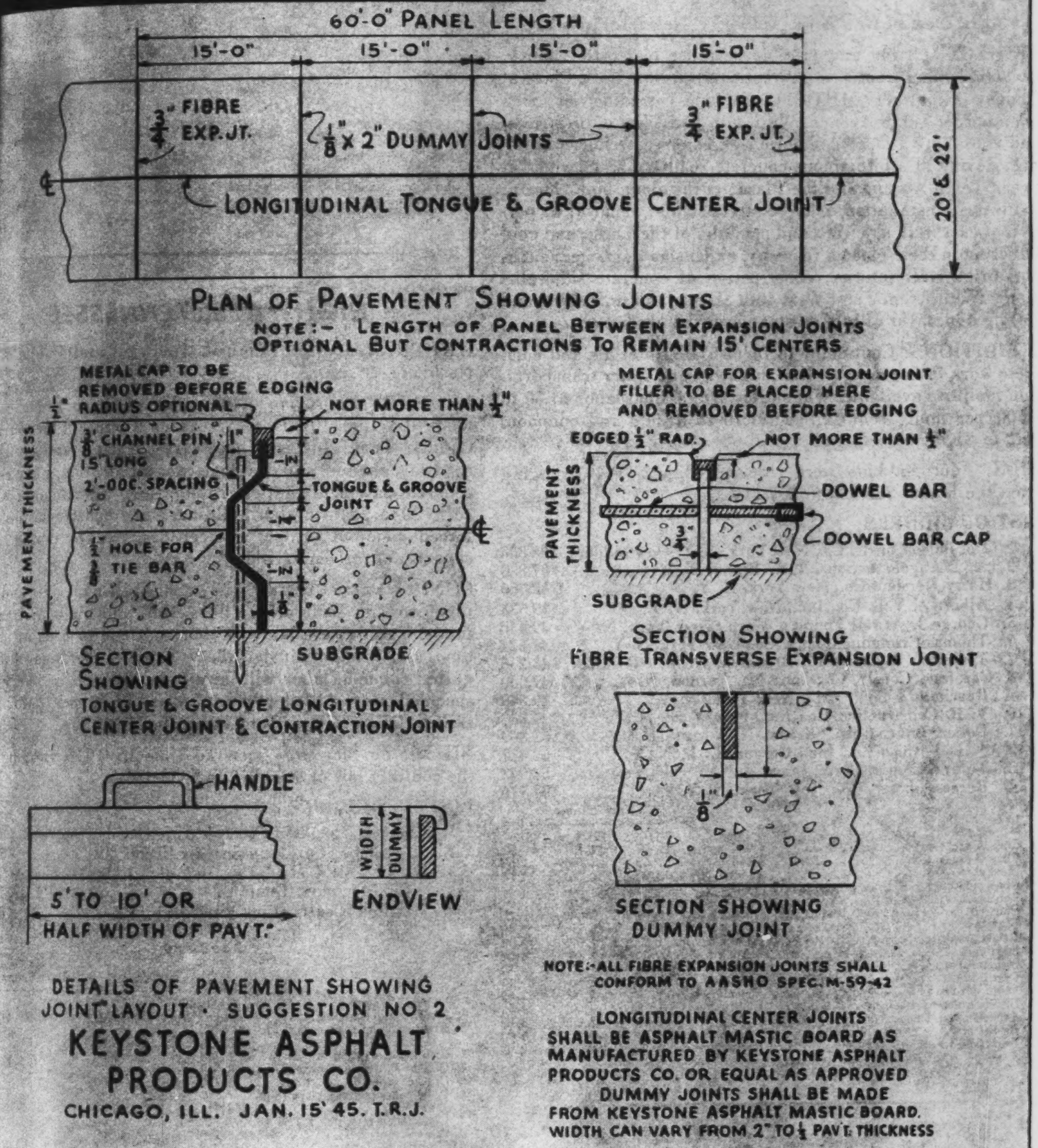
BIDS: Seven bids were received May 9, 1944, ranging from the contract low of $54,974 to $65,230.

LIST OF BIDDERS:

1. Charles Capone, Roslindale, Mass. (contract)	$54,974
2. Warren Bros. Roads Co., Cambridge, Mass	55,060
3. Baker & Co., Hyde Park, Mass	55,700
4. Hancock Constr. Co., Jamaica Plain, Mass	57,000
5. Rosano Constr. Co., Inc., E. Boston, Mass	58,685
6. Edward M. Matz, Inc., Jamaica Plain, Mass	62,795
7. Earl M. Carriere, Roslindale, Mass	65,230

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Water box excavation	200 c. y.	$1.50	$2.00	$1.00
2. Bank gravel	20 tons	1.00	1.25	1.00
3. Old concrete base removed	200 s. y.	.50	1.00	1.00
4. Old granite blocks removed	19,500 s. y.	.40	45	45
5. Edgestone reset	300 l. f.	.38	.45	35
6. Concrete base furnished and laid	2,700 c. y.	7.20	7.00	7.00
7. Granite block relaid	100 s. y.	2.90	3.00	2.00
8. Sheet asphalt pavement	19,500 s. y.	1.38	1.35	1.40

Plan No. 2


60'-0" PANEL LENGTH
15'-0"
15'-0"
15'-0"
15'-0"
3/4" FIBRE EXP. JT.
1/8" x 2" DUMMY JOINTS
3/4" FIBRE EXP. JT.
℄
LONGITUDINAL TONGUE & GROOVE CENTER JOINT
20' & 22'
PLAN OF PAVEMENT SHOWING JOINTS
NOTE:- LENGTH OF PANEL BETWEEN EXPANSION JOINTS OPTIONAL BUT CONTRACTIONS TO REMAIN 15' CENTERS
METAL CAP TO BE REMOVED BEFORE EDGING
1/2" RADIUS OPTIONAL
NOT MORE THAN 1/2"
3/8" CHANNEL PIN 15" LONG 2'-0 O.C. SPACING
1"
TONGUE & GROOVE JOINT
1/2" HOLE FOR 3/8" TIE BAR
PAVEMENT THICKNESS
1/8"
SUBGRADE
SECTION SHOWING TONGUE & GROOVE LONGITUDINAL CENTER JOINT & CONTRACTION JOINT
METAL CAP FOR EXPANSION JOINT FILLER TO BE PLACED HERE AND REMOVED BEFORE EDGING
EDGED 1/2" RAD.
NOT MORE THAN 1/2"
DOWEL BAR
DOWEL BAR CAP
PAVEMENT THICKNESS
3/4"
SUBGRADE
SECTION SHOWING FIBRE TRANSVERSE EXPANSION JOINT
HANDLE
5' TO 10' OR HALF WIDTH OF PAV'T.
WIDTH
DUMMY
END VIEW
1/8"
SECTION SHOWING DUMMY JOINT
DETAILS OF PAVEMENT SHOWING JOINT LAYOUT · SUGGESTION NO 2
KEYSTONE ASPHALT PRODUCTS CO.
CHICAGO, ILL. JAN. 15' 45. T.R.J.

NOTE:- ALL FIBRE EXPANSION JOINTS SHALL CONFORM TO AASHO SPEC. M-59-42

LONGITUDINAL CENTER JOINTS SHALL BE ASPHALT MASTIC BOARD AS MANUFACTURED BY KEYSTONE ASPHALT PRODUCTS CO. OR EQUAL AS APPROVED

DUMMY JOINTS SHALL BE MADE FROM KEYSTONE ASPHALT MASTIC BOARD. WIDTH CAN VARY FROM 2" TO 1/4 PAV'T. THICKNESS

PLAN No. 2 is designed for those engineers who prefer to use dummy joint as a contraction joint rather than Keystone's Tongue and Groove Center strip as suggested in Plan No. 1. In this alternate plan, Keystone Mastic Board Dummy Joint is used as a contraction joint to create the "plane of weakness". Keystone Tongue and Groove Joint is used for center strip.

When the plane of weakness type of joint is preferred by the engineering authorities, the Keystone method of installing permits these joints to be kept on the vertical and due to the rigidity of Keystone Mastic Board it eliminates the snaking action which occurs when non rigid flexible ribbon strips are used. The Keystone method also does away with the use of expensive installing machinery. Lower initial cost of material and labor, and the ease of handling are other factors influencing its adoption by contractors throughout the country.

PAVING AND GRADING NEW YORK

OWNER: Port of New York Authority, New York, N. Y.

PROJECT: Paving and grading entrance to North Tube of Lincoln Tunnel from Tenth Avenue to the New York Plaza of Tunnel (Contract MHT-67). Includes grading of area bounded by Tenth Avenue, West 39th and West 40th Streets, and New York Plaza; demolition of 5-story warehouse building; paving of a bituminous concrete roadway 33-ft. wide between Tenth Avenue and the Plaza; curbs along both sides of roadways; installation of three street lights; removal of portion of east wall, sidewalk and conduits of the plaza, and constructing in their place a roadway, expansion dam, steel curbs and brick wall returns; construction of concrete sidewalks along Tenth Avenue and West 40th Street; and furnishing and rolling 6-in. layer of broken stone over the graded areas.

CONDITIONS: Contractor to furnish all materials and complete work in five months. Rail, highway and water transportation facilities available. Wage rates are: skilled labor $1.50 to $2.00 per hour; semi-skilled, $1.10 to $1.50; and common, 95c. to $1.10.

BIDS: Fourteen bids were received May 2, 1944, ranging from the low of $28,838 to $57,116.

LIST OF BIDDERS:

1.	Del Balso Constr. Co., New York, N. Y. (low bidder)	$28,838
2.	A. D'Angelo & Sons, Inc., Bronx, N. Y	37,830
3.	Harry Hershon Co., New York, N. Y	38,766
4.	Albert A. Volk Co., Inc., New York, N. Y	39,533
5.	George J. Atwell Found'n. Corp., New York, N. Y	39,656
6.	Thomas Crimmins Cont'g. Co., New York, N. Y	41,521
7.	Tompkins & Crawford, Brooklyn, N. Y	43,256
8.	Garofano Constr. Co., Inc., Mt. Vernon, N. Y	47,000
9.	Rusciano & Son Corp., New York, N. Y	49,849
10.	V. B. Construction Co., Inc., New York, N. Y	49,888
11.	Delma Engr. Corp., Bronx, N. Y	51,869
12.	A. DeBevoise Co., Inc., Corona, L. I., N. Y	52,417
13.	Tufano Cont'g. Corp., Jamaica, N. Y	53,943
14.	Reese-Tubman Co., New York, N. Y	57,116

		Unit Prices		
Item	Quan.	(1)	(2)	(3)
1. Class A excavation	6,700 c. y.	$1.50	$2.10	$1.50
2. Class B excavation	1,050 c. y.	1.50	4.00	6.50
3. Concrete	90 c. y.	15.00	20.00	30.00
4. Conc. sidewalk, 5-in. thick	465 s. y.	2.25	3.00	3.50
5. Conc. sidewalk, 8-in. thick	30 s. y.	2.70	4.00	4.00
6. Concrete curb	550 l. f.	1.00	2.00	1.75
7. Granite header	65 l. f.	1.50	4.00	2.00
8. Relaid granite curb	20 l. f.	1.50	2.00	2.00
9. Steel curb	250 l. f.	2.50	3.00	3.00
10. Structural steel	5,000 lb.	.30	.13	.13
11. Cast iron	2,320 lb.	.10	.10	.15
12. 12-in. vitrified pipe	65 l. f.	1.25	2.00	2.50
13. Bitum. concrete pavement	1,140 s. y.	1.75	3.00	2.50
14. Asphalt pavement	50 s. y.	2.50	2.75	3.00
15. Broken stone	750 c. y.	3.50	5.50	5.00
16. Unclassified work	Lump Sum	6,875.00	5,400.00	7,650.00

STREET SURFACING, KANSAS CITY, MO.

OWNER: City of Kansas City, Mo.

PROJECT: Resurfacing old streets with asphaltic concrete wearing surface in Kansas City as follows: Wornall Road between 63rd and 75th Streets; Prospect Avenue between 39th Street and Swope Parkway; and 15th Street between Jackson and Van Brunt Boulevard. Contract involves asphaltic wearing surface, and cleaning, tacking, sealing and chipping pavement.

CONDITIONS: Contractor to furnish all materials and complete work in 60 calendar days. Rail and highway transportation facilities available. Wage rates in Kansas City are: $1.40 to $1.65 per hour; semi-skilled, 95c. to $1.375; and common, 90c.

BIDS: Five bids were received July 5, 1944, ranging from contract low of $53,240 to $75,708.

LIST OF BIDDERS:

1.	Mid West PreCote Co., Kansas City, Mo. (contract)	$53,
2.	Tobin Asphalt Products, Inc., Kansas City, Mo.	59,
3.	Bowen Construction Co., Kansas City, Mo.	59,
4.	Musselman & Hall, Kansas City, Mo.	72,
5.	Blue Valley Asphalt Co., Kansas City, Mo.	75,

		Unit Prices	
Item	Quan.	(1)	(2)
1. Asphaltic concrete, in place	6,780 ton	$6.69	$7.45
2. Pavement cleaned, tacked, sealed and chipped	75,064 s. y.	.105	.12

HIGHWAYS, TENNESSEE

OWNER: Tennessee Dept. of Highways and Public Wor Nashville.

PROJECT: Improving 7.407 miles of State Route 9 fro Knoxville City Limits to Anderson County Line, in Kno County, Tenn. Involves necessary clearing and grubbin roadway, channel and drainage excavation; 8-in. plain ceme concrete pavement; gutter; rubble stone riprap; pipe culver 15 to 30-in.; moving ten buildings; and construction of rei forced concrete bridge. Project designed to double traf capacity out of Knoxville.

CONDITIONS: Contractor to furnish all materials and co plete work in 150 working days. Rail and highway transpo tation facilities available. Labor shortage in area at prese time, and it is anticipated that a large percentage of the r quired common labor will have to be shipped in. Wage rate specified are: skilled labor, $1.00 to $1.50 per hour; semi skilled, 75 to 87½c.; and common, 55 to 75c.

BIDS: Four bids were received June 16, 1944, ranging fro the contract low of $600,978 to $853,028.

LIST OF BIDDERS:

1.	Foster & Creighton Co., Nashville, Tenn. (contract)	$600,97
2.	Stacy Bros. Co., Johnson City, Tenn	699,63
3.	H. E. Wolf Constr. Co., Inc, and J. B. Michael & Co, Memphis, Tenn	780,03
4.	Harrison Constr. Co., Pittsburgh, Pa	853,02

Roadway

		Unit Prices		
Item	Quan.	(1)	(2)	(3)
1. Clearing and grubbing	Lump Sum	$7,560.00	$5,000.00	$17,10
2. Road and drainage excav. (unclass.)	263,018 c. y.	.32	.58	
3. Channel excavation (unclass.)	2,748 c. y.	2.00	1.25	
4. Culvert excavation (unclass.)	8,942 c. y.	.50	1.25	
5. Crushed stone, tr. bd. rdway	15,775 c. y.	3.00	3.50	
6. Cem. conc. pavmt., plain (8-in. uniform)	114,711 s. y.	2.40	2.57	
7. Class A concrete	728.2 c. y.	40.00	35.00	35.
8. Class B concrete	180.7 c. y.	40.00	35.00	35.
9. Steel bar reinforcing	80,522 lb.	.06	.07	
10. Remove, relay concrete pipe	76 l. f.	1.70	1.00	
11. Concrete gutter	631.2 c. y.	26.00	20.30	27.
12. Markers (rt.-of-way posts)	160 ea.	3.50	4.00	
13. Rubble stone riprap (plain)	160 c. y.	20.00	20.00	15.
14. Water for embankment	5,286 M gal.	1.50	2.00	
15. 15-in. pipe culvert (side-drain)	400 l. f.	2.00	1.75	
16. 18-in. pipe culvert (side-drain)	922 l. f.	2.25	2.25	
17. 24-in. pipe culvert (side-drain)	142 l. f.	3.50	3.20	
18. 18-in. pipe culvert	3,151 l. f.	2.25	2.25	
19. 24-in pipe culvert	751 l. f.	3.50	3.20	
20. 30-in. pipe culvert	305 l. f.	5.00	4.50	
21. Moving ten buildings in various locations	Lump Sum	25,475.00	22,010.00	14,950.

Bridge

		Unit Prices		
Item	Quan.	(1)	(2)	(3)
22. Removal of specified portions of existing structures	Lump Sum	$3,000.00	$6,000.00	$1,500.
23. Dry excavation	840 c. y.	2.25	2.00	5.
24. Wet excavation	364 c. y.	10.00	15.00	10.
25. Rock excavation	545 c. y.	10.00	15.00	12.
26. Class S concrete	10 c. y.	100.00	60.00	100.
27. Class A concrete	968.2 c. y.	42.00	38.00	41.
28. Class B concrete	100 c. y.	42.00	32.00	41.
29. Steel bar reinforcing	120,814 lb.	.06	.07	
30. Rock drilling	72 l. f.	.75	1.50	

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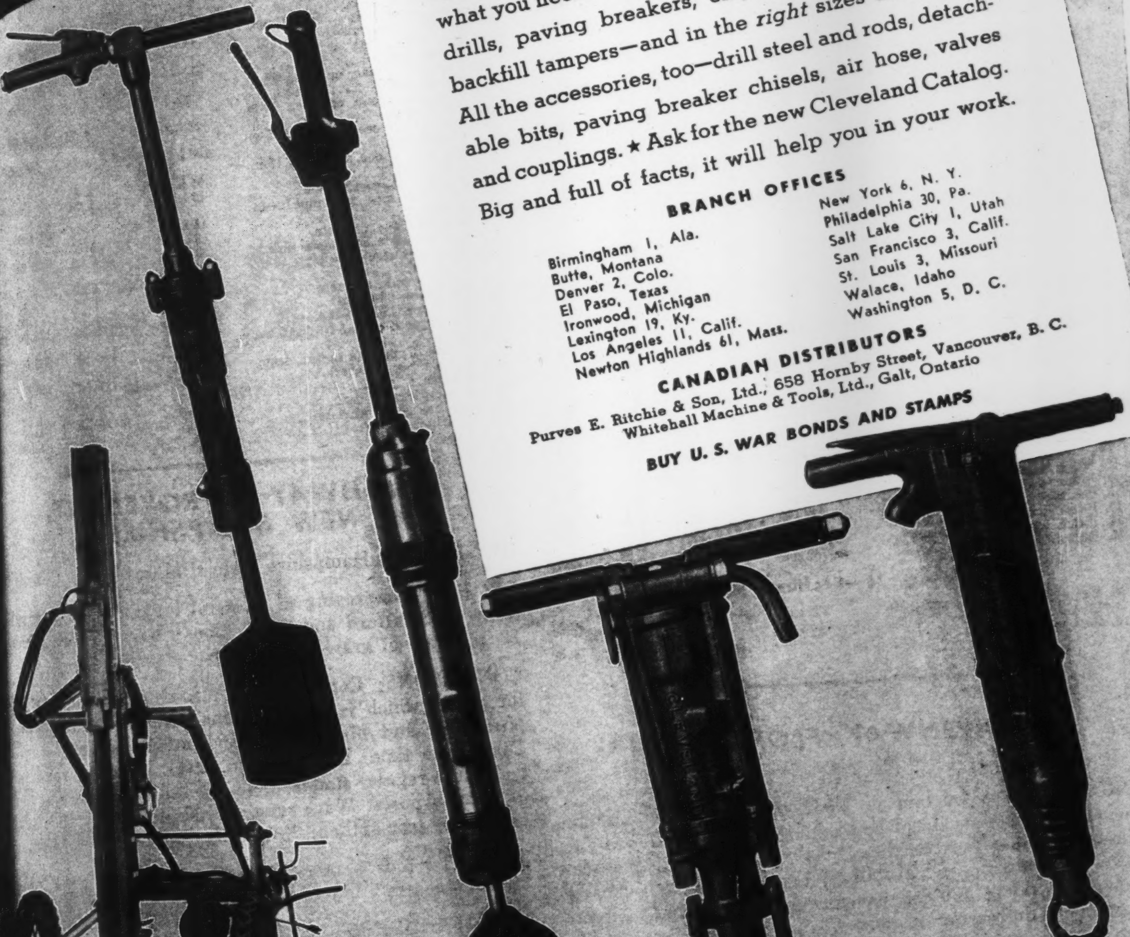

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LEADERS IN DRILLING EQUIPMENT

RESURFACING ROADS, INDIANA

OWNER: Indiana State Highway Commission, Indianapolis.

PROJECT: Resurfacing 13.27 miles of roadways with hot-mixed hot-laid bituminous base binder courses, and rock asphalt surfacing. Improvements are in Fort Wayne and Greenfield Districts, in Jay and Blackford Counties, Indiana. State Road No. 1, Section N (11 mi.) is from Jay-Wells County Line northward to Bluffton; State Road No. 1, Section M, (1 mi.) in Pennville; State Road 22 (1 mi.), in Hartford City; and State Road No. 26 (0.6 mi.) in Hartford City.

CONDITIONS: Contractor to furnish all materials and complete work in 111 working days from Aug. 31, 1944. Highway transportation facilities available. Wage rates specified are: skilled labor, $1.00 per hour; semi-skilled, 75c.; common, 65c.

BIDS: Four bids were received August 8, 1944, ranging from the contract low of $250,812 to $294,880. Engineer's estimate, $295,065.

LIST OF BIDDERS:

1. Wayne Paving Co., Fort Wayne, Ind. (contract)	$250,812
2. Hipskind Drainage Co., Fort Wayne, Ind.	257,476
3. Middle West Roads Co., Noblesville, Ind.	268,328
4. John Dehner Co., Inc., Fort Wayne, Ind.	294,880

Road 1—Section N

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Bitum. material for prime	28,000 gal.	$0.11	$0.12	$0.12
2. Bitum. material for prime base	2,200 gal.	.12	.12	.15
3. Subgrade fine aggregate	1,000 ton	3.00	3.00	3.00
4. Bitum. conc. base (hot-laid)	8,710 ton	6.13	6.25	6.60
5. Bitum. conc. binder (hot-laid)	14,200 ton	5.02	5.20	5.55
6. Rock asphalt	4,260 ton	14.55	15.00	14.70

Road 1—Section M

Item	Quan.	(1)	(2)	(3)
7. Bitum. material for prime	4,600 gal.	$0.11	$0.12	$0.12
8. Bitum. conc. binder (hot-laid)	2,350 ton	5.49	5.60	6.15
9. Rock asphalt	705 ton	15.02	15.40	15.65

Road 22—Section MM1

Item	Quan.	(1)	(2)	(3)
10. Bitum. material for prime	5,200 gal.	$0.12	$0.12	$0.12
11. Bitum. material for prime base	200 gal.	.13	.12	.15
12. Subgrade fine aggregate	150 ton	3.00	4.00	3.00
13. Bitum. conc. base (hot-laid)	130 ton	7.22	6.95	8.60
14. Bitum. conc. binder (hot-laid)	3,125 ton	6.11	6.20	7.15
15. Rock asphalt	750 ton	15.64	15.50	14.80

Road 26—Section MM

Item	Quan.	(1)	(2)	(3)
16. Bitum. material for prime	200 gal.	$0.12	$0.12	$0.12
17. Bitum. conc. binder (hot-laid)	85 ton	6.11	6.20	7.15
18. Rock asphalt	26 ton	15.64	15.50	14.80

HIGHWAY, FLORIDA

OWNER: Florida State Road Dept., Tallahassee.

PROJECT: Construction of 4.335 miles of 9-7-9-in. plain cement concrete pavement between Hammond Boulevard and Cassat Avenue, Jacksonville, Duval County, Fla. Includes necessary clearing and grubbing; regular and ditch excavation; removal of existing pavement; plain cement concrete pavement; timber for structures; pipe culvert; cross drains; side drains; underdrains; inlets and manholes; sprigging; relaying brick pavement; concrete guard rail posts; and concrete ditch pavement.

CONDITIONS: Contractor to furnish all materials and complete work in 175 working days. Rail, highway and water transportation facilities available. Prevailing wages to be paid on project.

BIDS: Seven bids were received February 17, 1944, ranging from the low of $239,983 to $270,643.

LIST OF BIDDERS:

1. L. J. & W. L. Cobb, Inc., Tampa, Fla. (low bidder)	$239,983
2. Duval Engr. & Contr. Co., Jacksonville, Fla.	244,539
3. R. H. Wright & Son, Columbus, Ga.	
4. M. J. Carroll Contr. Co., Leesburg, Fla.	
5. Ivy H. Smith Co., Jacksonville, Fla.	
6. S. B. Brinson, Tampa, Fla.	
7. Espy Paving & Constr. Co., Savannah, Ga.	

Item	Quan.	Unit Prices (1)	(2)
1. Clearing and grubbing	59.97 ac.	$120.00	$90.00
2. Regular excavation	40,352 c. y.	.43	.33
3. Lateral ditch excavation	6,580 c. y.	35	.40
4. Remove exist. pavmt. (brick and mac. asph.)	940 s. y.	50	.40
5. Overhaul	107,142 sta. c. y	.02	.01
6. Ocala rock base (single crse., 6-in. thick)	2,002 s. y.	1.50	1.40
7. Tar prime material, RT-2	400 gal.	.20	.20
8. Cover material for Type 2	56 c. y.	7.50	8.00
9. Bituminous mat'l. (surf. trtmt.)	1,202 gal.	.20	.18
10. Cement concrete pavement, plain (9-7-9-in.)	61,079 s. y.	2.76	2.97
11. Treated structural timber	8.47 Mbm.	225.00	200.00
12. Untreated structural timber	0.33 Mbm.	275.00	125.00
13. Concrete, Class A. (culverts)	298.63 c. y.	46.00	35.00
14. Concrete, Class A (headwalls)	16.92 c. y.	46.00	42.50
15. Concrete handrail	180 l. f.	1.40	5.00
16. Reinforcing steel	29,154 lb.	.06	.075
17. Pipe culvert (conc. or vit. clay, 12-in. cross drain)	44 l. f.	1.50	2.50
18. Pipe culv. (conc. or v. c., 18-in. cross drain)	263 l. f.	2.25	3.25
19. Pipe culv. (conc. or v. c., 24-in. cross drain)	36 l. f.	3.25	4.00
20. Pipe culv. (conc. or v. c., 30-in. cross drain)	126 l. f.	4.75	5.50
21. Pipe culv. (conc. or v. c., 36-in. cross drain)	104 l. f.	6.50	6.50
22. Pipe culv. (conc. or v. c., 18-in. side drain)	351 l. f.	2.25	3.25
23. As above, 24-in. side drain	42 l. f.	3.25	4.00
24. Relay exist. cross drain pipe (24-in. conc.)	46 l. f.	1.75	4.00
25. As above, 36-in. concrete	43 l. f.	3.00	5.00
26. As above, 48-in. corr. metal pipe	20 l. f.	5.00	6.00
27. Relay exist. side drain pipe, 18-in. conc.	508 l. f.	1.50	3.50
28. As above, 24-in. concrete	25 l. f.	1.75	4.00
29. Underdrain (6-in. pipe)	522 l. f.	1.25	1.00
30. Inlet, Type C (0 to 4-ft. deep)	2 ea.	110.00	175.00
31. Inlet, Type E (4 to 6-ft. deep) no grate	1 ea.	140.00	200.00
32. Manhole, Type B (4 to 6-ft. deep, no. c. i. ring or cover)	1 ea.	125.00	150.00
33. Sprigging	167,000 s. y.	.0275	.03
34. Relay brick pavement	207 s. y.	2.00	1.50
35. Guard rail posts (concrete)	56 ea.	6.00	5.00
36. Conc. ditch pavement (4-in. thick)	4,797 s. y.	1.90	1.50

HIGHWAY IMPROVEMENT, NEW HAMPSHIRE

OWNER: **New Hampshire State Highway** Dept., Concord

PROJECT: Improving 11 miles of logging road (gravel) in **towns of Stratford and Odell, Coos County,** N. H. Width is **12-ft., depth of gravel is variable.**

CONDITIONS: Contractor to furnish all materials except **for gravel which is to be obtained from** designated borrow **pits. Rail and highway transportation** facilities available. **Completion time: December 15, 1944. Logging** road not to **be built to regular standard;** to be used in getting out lumber **for war purposes. Wage rates are: skilled** labor, 75c. to $1.00 **per hour; semi-skilled, 75 to 90c.; and** common, 60 to 80c.

BIDS: Five bids were received September 22, 1944, ranging **from the contract low of $46,135 to** $81,600.

LIST OF BIDDERS:

1. **M. DeMatteo Constr. Co.,** Quincy, Mass. (contract)	$46,135
2. **Kenneth E. Curran, Littleton,** N. H.	54,920
3. **W. H. Hinman, Inc., North Anson,** Me.	67,860
4. **Rome Construction Co., Holden,** Mass	70,920
5. **Henley-Lundgren Co.,** Worcester, Mass.	81,600

Item	Quan.	Unit Prices (1)	(2)
1. Clearing and grubbing	36 ac.	$100.00	$150.00
2. Unclassified excav., incl. borrow	40,000 c. y.	.45	.45
3. Unclassified trench excavation	400 c. y.	2.00	3.00
4. Unclassified structure excavation	100 c. y.	1.25	5.00
5. Gravel borrow, base	16,800 c. y.	.70	.90
6. 15-in. plain concrete pipe	2,400 l. f.	2.00	3.00
7. 6-ft. span log culvert	8 ea.	150.00	75.00
8. 10-ft. span log culvert	5 ea.	250.00	200.00
9. 16-ft. span log culvert	4 ea.	400.00	250.00
10. 28-ft. span timber bridge	2 ea.	700.00	1,200.00
11. 64-ft. span timber bridge	1 ea.	1,600.00	2,500.00

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HIGHWAYS, NEW JERSEY

OWNER: New Jersey State Highway Dept., Trenton.

PROJECT: Construction of Route 24, Section 22 and Route 24-N, Section 1, from Fifth Street to the Phillipsburg Toll Bridge Plaza, Warren County, N. J. Involves 10-in. reinforced concrete paving 1.593 miles of roadway; construction of reinforced concrete underpass at the West Bound Ramp; and a reinforced concrete bridge at the Ingersoll-Rand Co.

CONDITIONS: Contractor to furnish all materials and complete work in 140 working days. Rail and highway transportation facilities available. Wage rate minimums are: skilled labor, $1.20; semi-skilled, 65c.; and common, 50c.

BIDS: Eleven bids were received September 18, 1944, ranging from the contract low of $699,048 to $939,582.

PARTIAL LIST OF BIDDERS:

1. Fred Berlanti & Son, Inc., Harrison, N. Y. (contract)	$699,048
2. Weldon Contracting Co., Westfield, N. J.	788,955
3. Franklin Contracting Co., Newark, N. J.	815,840

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing site	Lump Sum	$3,500.00	$6.000.00	$1.000.00
2. Roadway excavation, earth	77,916 c. y.	.50	.56	.50
3. Roadway excavation, rock	29,524 c. y.	2.00	2.40	3.00
4. Pavement excavation	15,600 s. y.	.50	.60	.50
5. Rock excavation, subsurface struct.	5,000 c. y.	5.00	6.00	4.00
6. Subbase	18,000 c. y.	.90	1.20	1.00
7. Stripping	16 ac.	70.00	300.00	150.00
8. Topsoiling, 4-in	35,300 s. y.	.21	.30	.40
9. Topsoiling, 6-in	18,000 s. y.	.25	.35	.40
10. Class C conc. struct. and roadway	760 c. y.	20.00	30.00	30.00
11. White conc. vertical curb	24,200 l. f.	1.10	1.25	1.20
12. 15x8-in. white conc. sloping curb	14,300 l. f.	1.20	1.40	1.35
13. 12x5½-in. white conc. sloping curb	600 l. f.	.80	1.00	.90
14. Reset precast conc. sloping curb	340 l. f.	.40	.50	.40
15. 4-in. concrete sidewalk	5,300 s. y.	2.15	2.50	2.45
16. White conc. island paving	300 s. y.	3.40	3.80	3.75
17. Reset monuments	25 ea.	5.00	10.00	20.00
18. Sodding	500 s. y.	.60	1.00	.60
19. Subgrade	60,975 s. y.	.10	.15	.20
20. 6-in. plain conc. pavmt. surface.	850 s. y.	2.60	3.00	2.85
21. 10-in. conc. pavmt. surf. (excl. rein.)	55,592 s. y.	3.20	2.90	3.20
22. 18-in. bridge approach slabs	133 s. y.	4.50	7.50	5.50
23. 8-in. plain concrete base course	4,400 s. y.	3.25	2.30	2.40
24. Concrete pavement footings	35 c. y.	13.00	20.00	16.25
25. Pavement, type A, 1-in. thick	1,308 ton	7.50	10.00	8.75
26. Pavement, type T, 1-in. thick	1,308 ton	....	....	....
27. Pavement, type A, bottom course	1,275 ton	7.50	9.00	8.75
28. Pavement, type T, bottom course	1,275 ton	....	....	....
29. 3-in. mod. pen. macadam intermed. course	9,600 s. y.	.85	.75	.90
30. 4-in. macadam base course	14,750 s. y.	.80	.75	1.20
31. Inlets, type A	2 ea.	110.00	140.00	125.00
32. Inlets, type B	117 ea.	150.00	140.00	150.00
33. Inlets, type B, using existing castings	3 ea.	100.00	90.00	100.00
34. Inlets, type E	3 ea.	150.00	150.00	180.00
35. Manholes	7 ea.	175.00	140.00	210.00
36. Special manholes	4 ea.	300.00	600.00	475.00
37. Reset inlet head	1 ea.	20.00	10.00	10.00
38. Reset manhole heads	6 ea.	30.00	10.00	10.00
39. New manhole head	1 ea.	50.00	50.00	40.00
40. 12-in. rein. conc. culv. pipe	138 l. f.	2.35	1.90	2.45
41. 18-in. rein. conc. culv. pipe	6,916 l. f.	3.00	2.60	2.75
42. 24-in. rein. conc. culv. pipe	1,340 l. f.	4.00	3.80	4.00
43. 30-in. rein. conc. culv. pipe	48 l. f.	8.00	5.50	6.00
44. 36-in. rein. conc. culv. pipe	1,284 l. f.	6.00	6.60	6.50
45. 42-in. rein. conc. culv. pipe	1,050 l. f.	7.50	8.70	8.00
46. 48-in. rein. conc. culv. pipe, ext. stren	156 l. f.	10.00	12.40	11.50
47. 66-in. rein. conc. culv. pipe, ext. stren	1,032 l. f.	36.00	52.80	45.00
48. 66-in. rein. conc. culv. pipe, ext. stren	44 l. f.	65.00	82.80	65.00
49. Shoring and bracing	11 Mbm.	90.00	200.00	150.00
50. 8-in. c. i. water pipe, Class A	30 l. f.	5.00	2.80	2.50
51. 10-in. c. i. water pipe, Class A	78 l. f.	5.00	3.60	3.50
52. 18-in. c. i. culv. pipe, ext. heavy.	24 l. f.	6.00	5.60	5.25
53. 6-in. pl. conc. or vitr. clay pipe	264 l. f.	1.30	1.40	1.60
54. Underdrain, type F	3,000 l. f.	1.00	1.20	1.50
55. Class B conc. in culverts	63 c. y.	20.00	45.00	60.00
56. Class C conc. in culverts	150 c. y.	20.00	31.00	45.00
57. Class D conc. in culverts	114 c. y.	20.00	25.00	30.00
58. Wood guard fence	2,000 l. f.	1.10	1.10	2.00
59. Wood barricade	68 l. f.	2.50	5.00	2.50
60. Ditching	70 c. y.	2.00	1.00	2.00
61. Found'n. excav., conc. structures	1,010 c. y.	2.50	3.00	2.50
62. Earth excav., subsurf. structures	300 c. y.	2.50	3.00	3.50
63. Earth excav., test pits	100 c. y.	3.00	3.50	2.10
64. Broken stone or screen. gravel	210 c. y.	3.00	5.00	3.00
65. Riprap slope protection	40 c. y.	10.00	12.00	15.00
66. Grouted rubble stone gutter	350 s. y.	3.50	4.00	2.50
67. Single guard fence posts	90 ea.	5.00	4.00	8.00
68. Asbestos-cement conduit, 4-in	304 l. f.	3.25	1.50	1.25
69. Asbestos-cement conduit, 2½-in	256 l. f.	3.10	1.00	1.15
70. Federal project marker posts	6 ea.	5.00	25.00	[illegible]
71. Reset wire rope railing	218 l. f.	1.00	1.00	[illegible]
72. Reinforcing steel for 10-in. conc. pavement	372,800 lb.	.035	.048	[illegible]
73. Wood joint filler	9,000 l. f.	.35	.80	[illegible]
74. 4-in. concrete joint sills	4,250 s. y.	2.00	2.50	[illegible]
75. Monuments (setting only)	75 ea.	2.00	5.00	[illegible]
76. Foundation excav., underpass	1,121 c. y.	2.50	3.75	[illegible]
77. Treated timber piles, underpass.	3,875 l. f.	1.50	2.20	[illegible]
78. Concrete balustrade, underpass	231 l. f.	8.00	6.00	[illegible]
79. Class B conc., underpass struct.	178 c. y.	40.00	61.00	[illegible]
80. Class C conc., underpass struct.	,211 c. y.	20.00	22.50	[illegible]
81. Class D conc., underpass struct.	347 c. y.	15.00	14.50	[illegible]
82. Structural steel, underpass	825 lb.	.15	.14	[illegible]
83. Rein. steel, underpass struct	49,485 lb.	.065	.065	[illegible]
84. Waterproofing	442 s. f.	1.00	.50	[illegible]
85. 8-in. vitr. clay pipe drains	133 l. f.	2.00	1.00	[illegible]
86. 12-in. vitr. clay pipe drains	80 l. f.	3.00	1.50	[illegible]
87. Lighting units	4 ea.	75.00	100.00	[illegible]
88. Transformer pit frame and cover	1 ea.	100.00	100.00	[illegible]
89. 2-in. conduit	240 l. f.	3.00	1.50	[illegible]
90. Cofferdam flooring	2.5 Mbm.	100.00	100.00	[illegible]
91. Foundation excavation, bridge	560 c. y.	2.50	5.65	[illegible]
92. Concrete balustrade, bridge	113 l. f.	8.00	6.00	[illegible]
93. Class B conc., bridge struct	188 c. y.	40.00	41.00	[illegible]
94. Class C conc., bridge struct	252 c. y.	20.00	25.75	[illegible]
95. Rein. steel, bridge structures	19,500 lb.	.065	.07	[illegible]
96. Clearing site, Ingersoll-Rand Bridge	Lump Sum	1,000.00	1,200.00	1,800

HIGHWAY SURFACING WISCONSIN

OWNER: State Highway Commission of Wisconsin, Madi son. J. A. Stransky, division engineer.

PROJECT: Portland cement concrete surfacing 1.0 mile o S.T.H. No. 62 in Milwaukee County, between South Milwau kee and Milwaukee. Includes necessary clearing, grubbing removing old pavement and structures, 9-in. concrete pave ment, drainage facilities, culverts, combination concrete cur and gutter, sidewalks, and concrete safety islands.

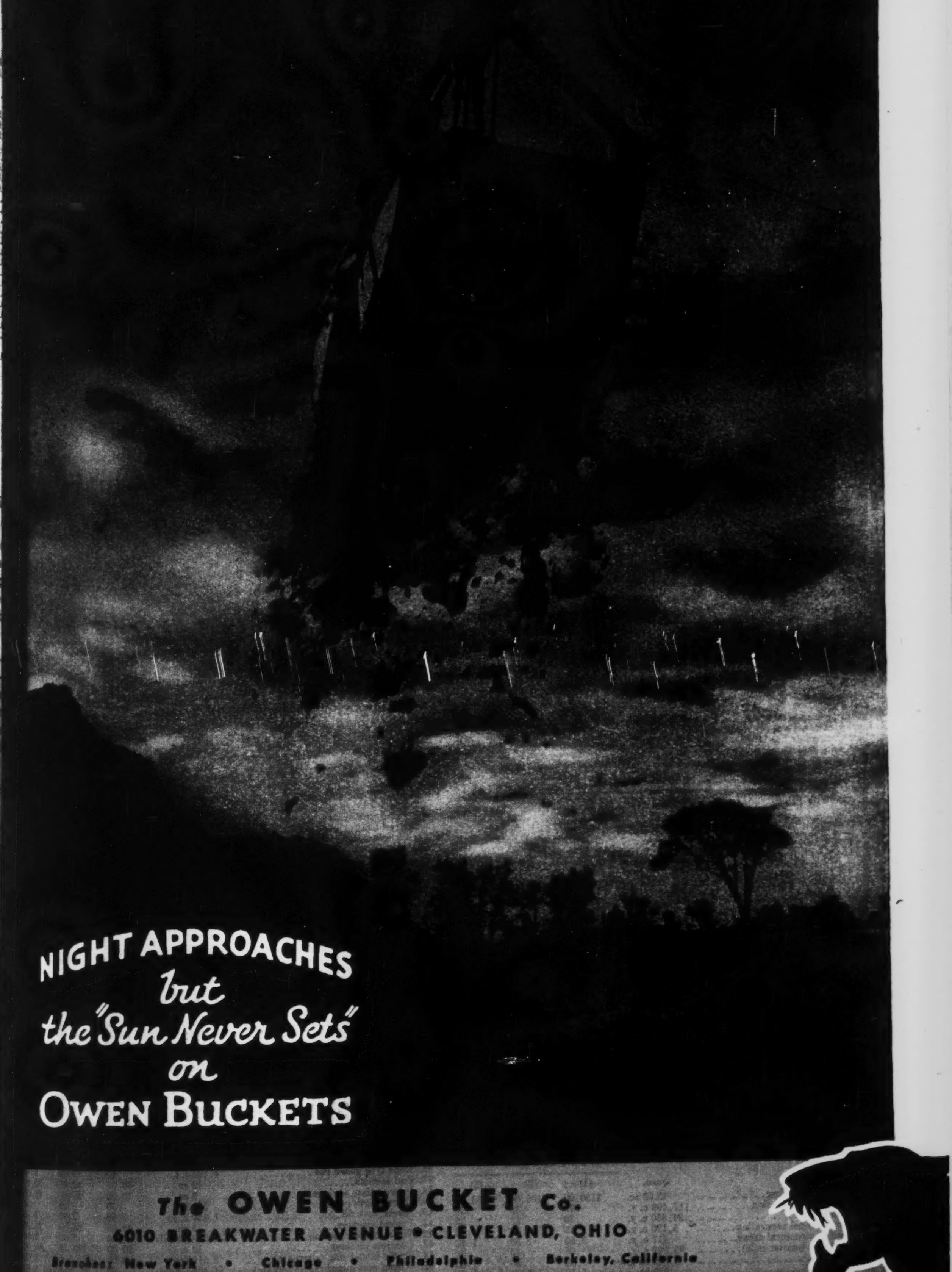
CONDITIONS: Contractor to furnish all materials and com plete work in 130 working days. Rail and highway trans portation facilities available. Labor scarcity exists in are due to proximity of industrial section of Milwaukee, Wes Allis and other smaller manufacturing cities. Wage rates are: skilled labor, $1.60 per hour; semi-skilled, $1.40; and common, $1.05.

BIDS: Five bids were received June 27, 1944, ranging from the contract low of $228,810 to $248,029.

LIST OF BIDDERS:

1. Kramp Constr. Co., Milwaukee, Wis. (contract)	$228,810
2. Koch Constr. Co., Milwaukee, Wis.	230,263
3. Milwaukee General Constr. Co., Milwaukee, Wis.	231,541
4. E. & C. Co., Milwaukee, Wis.	245,590
5. R. R. Birdsall & Sons Co., Racine, Wis.	248,029

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing	454 in. dia.	$1.50	$1.50	$0.60
2. Grubbing	454 in. dia.	2.00	1.50	.60
3. Remove old pavement	25,752 s. y.	.45	.40	.50
4. Remove curb and gutter	161 l. f.	.25	.25	.25
5. Remove concrete sidewalk	1,274 s. y.	.35	.30	.30
6. Remove catch basins	6 ea.	56.00	56.00	50.00
7. Remove 12-in. concrete wall	68 c. y.	7.00	7.00	5.00
8. Unclassified excavation	4,338 c. y.	.90	1.00	.75
9. Sand-gravel fill	741 c. y.	1.45	1.75	1.50
10. Concrete pavement, 9-in	29,286 s. y.	2.73	2.78	2.80
11. Concrete pavement driveways	375 s. y.	2.90	3.10	2.70
12. Concrete spillway	1 ea.	1,500.00	1,500.00	1,300.00
13. Fiber conduit, 3-in	22 l. f.	1.00	1.00	.90
14. Conduit, 2-in	135 l. f.	1.00	.85	.90
15. Pipe underdrain, 6-in	105 l. f.	3.85	3.85	3.85
16. Non-rein. conc. sewer pipe, 8-in	974 l. f.	3.75	3.75	3.75
17. 24-in. rein. conc. sewer pipe	50 l. f.	10.85	10.85	10.85
18. 27-in. rein. conc. sewer pipe	2,577 l. f.	12.00	12.00	12.00
19. 33-in. rein. conc. sewer pipe	1,221 l. f.	11.50	11.50	11.90
20. 12-in. rein. conc. culvert pipe	1,530 l. f.	4.80	4.80	4.80
21. 15-in. rein. conc culvert pipe	1,328 l. f.	5.00	5.00	5.00
22. 18-in. rein. conc. culvert pipe	1,890 l. f.	9.80	9.80	10.00
23. 18-in. rein. conc. culv. pipe, cradled	198 l. f.	22.00	22.00	22.00
24. 24-in. rein. conc. culv. pipe, cradled	137 l. f.	24.00	24.00	24.00
25. 18-in. encased rein. conc. culv. pipe	15 l. f.	22.00	22.00	22.00
26. Catch basins, Type A, special	44 ea.	186.00	186.00	196.00
27. Catch basins, Type B, special	1 ea.	280.00	280.00	280.00
28. Manholes, special	33 ea.	185.00	185.00	190.00
29. Conc. combination curb and gutter, 22-in	10,880 l. f.	1.35	1.38	1.30
30. Concrete sidewalk, 5-in	26,850 s. f.	.27	.29	.28
31. Concrete safety islands	182 s. f.	.60	.56	.50



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GRADING FOR "FLOATING ROAD" NORTH CAROLINA

OWNER: North Carolina State Highway and Public Works Comn., Raleigh.

PROJECT: Grading, hydraulic fill between point 195 ft. east of Pasquotank River Bridge and Camden, Camden County, N. C. on Route No. 158. Approximately 2.33 miles in length. Work under this contract includes clearing; removal of unsatisfactory material within construction limits; drainage ditch excavation; placing of pipe and headwalls, and right-of-way markers; and construction of embankment.

CONDITIONS: Contractor to furnish all materials and complete work in 450 calendar days. Rail, highway and water transportation facilities available. Traffic to be maintained on present road, causeway bridge, and on the necessary temporary structures during construction. Borrow area provided by Commission where contractor may obtain fill material without cost. No wage rates specified, but contractor's attention is directed to the Fair Labor Standards Act of 1938, and the application is the responsibility of contractor.

BIDS: Eight bids were opened May 9, 1944, ranging from low of $316,813 to $694,798.

LIST OF BIDDERS:

1. R. C. Huffman Constr. Corp., Norfolk, Va. (low bidder)	$316,813
2. W. L. Cobb Constr. Co., Decatur, Ga.	379,566
3. Atlantic Dredging Constr. Co., Pine Bluff, Ark.	386,171
4. Norfolk Dredging Co., Norfolk, Va.	399,972
5. The Arundel Corp., Baltimore, Md.	440,900
6. Diamond Constr. Co., Washington, D. C.	499,936
7. C. Walker Hodges Dredging Co., New Bern, N. C.	546,810
8. Merritt Dredging Co., Charleston, S. C.	694,798

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing	26 ac.	$300.00	$300.00	$300.00
2. Unclassified excavation	1,000 c. y	.85	3.00	1.00
3. Excavation of unsatisfactory material	591,300 c. y.	.205	.166	.15
4. Drainage ditch excavation	100 c. y.	1.00	2.00	1.00
5. Borrow excavation	899,300 c. y.	.205	.30	.32
6. Class C. concrete headwalls	3 c. y.	50.00	60.00	60.00
7. 36-in. rein. concrete pipe	76 l. f.	30.00	5.00	8.00
8. Right-of-way markers	6 ea.	10.00	10.00	2.00

HIGHWAYS, TEXAS

OWNER: Texas State Highway Comm., Austin.

PROJECT: Grading, structures, concrete pavement and flexible base shoulders from 3.3 miles west of New Boston to DeKalb on U. S. Highway 82 in Bowie County, Tex.

CONDITIONS: Contractor to furnish all materials and complete work in 200 working days. Preference rating AA-3. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.10 per hour; semi-skilled, 65c.; and common, 50c.

BIDS: Seven bids were received October 24, 1944, ranging from the contract low of $369,792 to $507,408.

PARTIAL LIST OF BIDDERS:

1. Austin Road Co., Dallas, Tex. (contract)	$369,792
2. Texas Bitulithic Co., Dallas, Tex.	371,981
3. Harrison Engr. & Constr. Corp., Kansas City, Mo.	375,949

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing and grubbing	13.59 ac.	$150.00	$100.00	$80.00
2. Common road excavation	117,499 c. y.	.32	.30	.28
3. Common borrow	24,850 c. y.	.30	.35	.28
4. Common channel excavation	5,120 c. y.	.43	.35	.28
5. Unclassified structural excav.	417 c. y.	3.50	2.50	1.50
6. Overhaul (yd. quarter-mile)	93,992 c. y.	.06	.10	.08
7. Sprinkling	4,552 M gal.	.50	.50	1.00
8. Rolling	979 hr.	5.50	5.00	4.50
9. Rolling	144 hr.	4.10	3.50	3.50
10. Salvage and repair flexible base	.583 c. y.	.65	.42	.75
11. Concrete pavement	128,066 s. y.	1.80	1.87	[illegible]
12. Reinforcing steel for pavement	484,730 lb.	.05	.044	[illegible]
13. Class A concrete	251.25 c. y.	32.50	36.00	[illegible]
14. Class A concrete (ext. struct.)	159.43 c. y.	35.50	40.00	[illegible]
15. Reinforcing steel	47,499 lb.	.056	.05	[illegible]
16. 18-in. std. rein. conc. pipe	24 l. f.	2.10	2.20	[illegible]
17. 24-in. ext. str. rein. conc. pipe	242 l. f.	3.25	3.20	[illegible]
18. Remove old structures (bridges)	1 ea.	365.00	300.00	[illegible]
19. Remove old structures (culverts)	26 ea.	58.00	35.00	[illegible]
20. Remove old struct. (conc. walls)	8 ea.	45.00	20.00	[illegible]
21. Remove old struct. (conc. foundation)	1 ea.	25.00	20.00	[illegible]
22. Move drainage structures	16 ea.	28.00	20.00	[illegible]
23. Mulch sodding	19,360 c. y.	.80	.82	[illegible]
24. Monolithic concrete curb	2,303 l.f.	.30	.25	[illegible]
25. Right-of-way markers	52 ea.	3.00	2.00	[illegible]

HIGHWAYS, WEST VIRGINIA

OWNER: West Virginia State Road Commission, Charleston

PROJECT: Grading, draining and concrete paving 1.29 miles of St. Albans-Lewis Road in Kanawha County, Wes Virginia. Includes clearing and grubbing; 246,100 cu. yd. o borrow excavation; 9,000,000 station yards of overhaul; macadam base course 8-in. thick for portion of length; drainage structures; timber piling for culvert; and other work necessary for completion of project.

CONDITIONS: Contractor to furnish all material and complete work in 225 working days. Rail, highway and water transportation facilities available. Wage rates are: skilled labor, $1.625 per hour; semi-skilled, $1.375; and common 75c. Scarcity of trucks for hauling and labor shortages might affect final cost.

BIDS: Seven bids were received August 29, 1944, ranging from the contract low of $476.697 to $661,467.

LIST OF BIDDERS:

1. Smith Construction Co., Huntington, W. Va. (contract)	$476,69
2. Price Construction Co., Huntington, W. Va.	532,830
3. W. H. Ringwald Sons Co., Chillicothe, Ohio	534,969
4. McHugh Brothers, Springfield, Ohio	538,381
5. Murphy Construction Co., Morgantown, W. Va.	578,140
6. Stellhorn & Beightler, Columbus, Ohio	599,697
7. Pinnell & Pfost, Ripley, W. Va.	661,46

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing and grubbing	30.5 ac.	$150.00	$300.00	$250.00
2. Unclassified excavation	6,110 c. y.	.70	1.00	1.00
3. Borrow excavation	246,100 c. y.	.74	.80	1.05
4. Overhaul	9,000,000 sta. y.	.005	.005	[illegible]
5. Structure excavation	7,140 c. y.	3.00	4.00	2.75
6. Macadam base course, 8-in	315 c. y.	7.00	8.00	9.00
7. Traffic bound base, limestone	2,830 ton	6.00	5.00	5.50
8. Limestone prime	90 ton	7.00	8.00	6.50
9. Tar prime	3,500 gal.	.20	.20	[illegible]
10. Asphalt conc. pavmt. wearing crse.	83 ton	14.00	15.00	16.00
11. Concrete pavement	23,510 s. y.	3.00	3.50	[illegible]
12. High early strength concrete	4,050 s. y.	3.30	4.00	[illegible]
13. Transverse expansion joint	4,780 l. f.	.40	.30	.40
14. Longitudinal expansion joint	1,280 l. f.	.25	.25	[illegible]
15. Pavement reinforcing	114,790 lb.	.08	.08	[illegible]
16. Dowel bars	25,070 lb.	.09	.10	.10
17. Tie bars	5,960 lb.	.09	.10	[illegible]
18. 18-in. rein. conc. pipe	4,650 l. f.	3.00	3.50	2.50
19. 24-in. rein. conc. pipe	2,120 l. f.	4.50	6.00	3.75
20. 36-in. rein. conc. pipe	300 l. f.	10.00	8.50	7.00
21. 24-in. rein. conc. pipe, ext. str	340 l. f.	5.00	7.00	[illegible]
22. Timber piling	6,650 l. f.	1.90	2.00	1.50
23. Class A concrete	435 c. y.	38.00	40.00	32.00
24. Class B concrete	148 c. y.	35.00	39.00	33.50
25. Reinforcing steel	51,850 lb.	.09	.08	[illegible]
26. Paint coat waterproofing	740 s. y.	1.50	1.00	[illegible]
27. White faced curb	2,400 l. f.	1.20	1.20	[illegible]
28. Integral curb	2,825 l. f.	1.00	1.00	[illegible]
29. Concrete gutter	112 s. y.	5.00	5.00	4.50
30. Concrete sidewalk	13,300 s. f.	.35	.40	[illegible]
31. Drop inlet castings	54 ea.	30.00	40.00	[illegible]
32. Manhole frames and covers	12 ea.	30.00	50.00	40.00
33. Drop inlets, except castings	59 ea.	75.00	100.00	65.00
34. Manholes, except castings	12 ea.	150.00	200.00	110.00
35. Median strip inlets	7 ea.	60.00	100.00	70.00
36. Rope type guard rail	4,103 l. f.	.90	1.00	1.10
37. End anchors	12 ea.	30.00	50.00	30.00
38. Intermediate anchors	6 ea.	30.00	50.00	25.00
39. Extra length posts	525 l. f.	.50	1.00	[illegible]
40. Special rock fill	1,450 c. y.	2.50	3.00	1.50
41. Project markers	5 ea.	30.00	25.00	25.00
42. Water for compaction	215 M gal.	6.00	7.00	3.00
43. Concrete cribbing	53 c. y.	80.00	100.00	85.00
44. Traffic bound slag (alternate)	2,519 ton	6.00	No Bid	[illegible]
45. Woven wire guard rail (alternate)	4,103 l. f.	.90	No Bid	[illegible]
46. End anchors (alternate)	12 ea.	30.00	No Bid	30.00
47. Intermediate anchors (alternate)	1 ea.	30.00	No Bid	25.00
48. Extra length posts (alternate)	525 l. f.	.50	No Bid	[illegible]

GHWAY IMPROVEMENTS, TENNESSEE

NER: Dept. of Highways and Public Works, State of nessee, Nashville.

OJECT: Grading, drainage, and concrete paving LaFay- Street in Nashville, beginning at Eighth Avenue and nding 1,447 miles to the East City Limits.

NDITIONS: Contractor to furnish all materials and com- te work in 225 working days. Wage rates specified : skilled labor, $1.25 per hour; semi-skilled, 75c.; and mon, 50c.

DS: Six bids were received September 1, 1944, ranging m the contract low of $410,799 to $677,171.

RTIAL LIST OF BIDDERS:

. William F. Bowe & Co., Augusta, Ga. (contract)	$410,799
Bowyer & Johnson, Jackson, Tenn.	435,266
. Foster & Creighton Co. and Oman Constr. Co., Nashville, Tenn.	466.350

Item	Quan.	UNIT PRICES (1)	(2)	(3)
Clearing and grubbing	Lump Sum	$500.00	$16,000.00	$1,350.00
Roadway and drainage excav.	34,670 c. y.	.90	.86	1.65
Borrow excavation (common)	15,336 c. y.	.90	1.12	.80
Culvert excavation (unclass.)	6,206 c. y.	2.50	3.45	4.25
Sodding	12,790 s. y.	.60	.60	.60
Crushed stone (tr. bd. rdwy.)	170 c. y.	3.50	3.50	3.25
Cement conc. pavement, plain (9-in. uniform)	62,755 s. y.	2.78	2.88	2.92
Gray iron castings (Grade 1)	58,330 lb.	.09	.07	.07
Class A concrete	219.1 c. y.	40.00	40.00	35.00
Class B concrete	1.3 c. y.	50.00	40.00	40.00
Steel bar reinforcing	2,240 lb.	.07	.08	.06
4-in. vitrified clay pipe	520 l. f.	.50	.50	.70
Brick masonry	71.98 M	85.00	67.00	75.00
Concrete sidewalk	99,722 s. f.	.28	.27	.28
Concrete driveway	11,718 s. f.	.36	.45	.40
Concrete curb	72.8 c. y.	35.00	35.00	30.00
Concrete comb. curb and gutter	1,320.2 c. y.	26.00	22.00	27.00
Water (for embankment)	270 M gal.	3.00	3.00	1.50
Concrete railroad crossing	83 s. y.	15.00	9.00	5.50
Remove, replace structures, etc.	Lump Sum	1,500.00	5,600.00	4,600.00
12-in. pipe culvert	98 l. f.	2.00	1.93	2.00
15-in. pipe culvert	1,445 l. f.	2.25	2.09	2.00
18-in. pipe culvert	1,944 l. f.	2.75	2.45	2.30
24-in. pipe culvert	1,789 l. f.	3.50	3.47	3.30
30-in. pipe culvert	1,500 l. f.	5.60	4.35	4.30
36-in. pipe culvert	100 l. f.	7.00	6.69	6.00
Dry excavation (bridges)	1,100 c. y.	2.00	3.00	2.00
Wet excavation (bridges)	82 c. y.	15.00	10.00	8.00
Rock excavation (bridges)	45 c. y.	15.00	15.00	13.00
Class S concrete (bridges)	17.2 c. y.	100.00	70.00	75.00
Class A concrete (bridges)	535.2 c. y.	45.00	47.00	50.00
Steel bar reinforcing (bridges)	50,473 lb.	.07	.06	.06
Rock drilling (bridges)	120 l. f.	1.50	1.50	1.00
6-in. conc. sewer pipe (non-rein.)	50 l. f.	2.50	.70	1.60
8-in. conc. sewer pipe (non-rein.)	160 l. f.	3.00	.86	2.00
3-in. pipe conduit (straight)	3,400 l. f.	.40	.40	1.00
3-in. pipe conduit (90-deg. bend)	190 ea.	3.50	5.00	8.00
2-in. pipe conduit (straight)	27,000 l. f.	.35	.35	.70
2-in. pipe conduit (90-deg. bend)	61 ea.	1.50	4.00	6.00
Conc. street light base	71 ea.	35.00	44.00	37.50
Conc. traffic light base	40 ea.	35.00	40.00	37.50
Concrete pull box	1 ea.	35.00	115.00	180.00

HIGHWAY AND BRIDGES, PENNSYLVANIA

WNER: Pennsylvania Dept. of Highways, Harrisburg.

ROJECT: Construction of highway and bridges (25,585- . long) in East Hanover, Union and Swatara Townships in ebanon County, Pa., Traffic Routes 22 and 72. Involves onstruction of reinforced cement concrete pavement 24-ft. ide on graded roadway having nominal width of 68 to 72 .; divided highway consisting of reinforced cement con- rete pavement 24- ft. wide on each side of a divisor area; einforced cement concrete pavement 24-ft., 36-ft. and vari- ble to 50.5-ft. wide; native stone Type A or crushed aggre- ate base with a bituminous surface 36-ft., 14-ft. and vari- ble in width; three reinforced concrete bridges and grad- ng 98 to 102 ft. wide; and also six reinforced concrete tructures.

CONDITIONS: Contractor to furnish all materials and complete work in 370 calendar days. Preference rating on project is AA-3. Contractor to employ forces a minimum of 16 hours per day beginning about April 1, 1945 on all items in connection with drainage and bridge structures; on all other items, a minimum of 10 hours per day. Rail and highway transportation facilities available. Minimum wage rates specified are: skilled labor, $1.00 per hour; intermediate grade labor, 85c.; and unskilled, 65c.

BIDS: Eleven bids were received October 24, 1944, ranging from the contract low of $1,225,752 to $1,630,252.

LIST OF BIDDERS:

1. Potts & Callahan Contracting Co., Inc., Baltimore Md. (contract)	$1,225,752
2. C. W. Good, Inc., Lancaster, Pa.	1,278,442
3. Lane Constr. Corp., Meriden, Conn.	1,290,980
4. Bero Engr. & Constr. Corp., Buffalo, N. Y.	1,295,799
5. Cayuga Constr. Corp., New York, N. Y.	1,346,878
6. National Structures Corp., New York, N. Y.	1,373,615
7. B. Perini & Sons, Inc., Framingham, Mass.	1,386,622
8. Arthur A. Johnson Corp., Long Island City, N. Y.	1,432,000
9. Johnson, Drake & Piper, Inc., New York, N. Y.	1,452.953
10. S. J. Groves & Sons Co., New York, N. Y.	1,469.355
11. Central Engineers, Hollidaysburg, Pa.	1,630,252

Item	Quan.	UNIT PRICES (1)	(2)	(3)
1. Clearing and grubbing	Lump Sum	$4,000.00	$3,000.00	$20,000.00
2. Class 1 excavation	425,694 c. y.	.49	.54	55
3. Class 2 excavation	9,604 c. y.	2.75	2.75	2.25
4. Borrow excavation	163,868 c. y.	.49	.45	30
5. Crushed stone	500 ton	3.00	3.75	3.00
6. Subgrade	133.845 s. y.	.12	.12	.15
7 Shoulders	32,967 l. f.	.20	.20	.20
8 Native stone or crushed aggr. base crse., 8-in. in depth	6,465 s. y.	1.25	1.25	1.50
9. As above, 10-in. in depth	992 s. y.	1.50	1.45	1.75
10. Aggregate surfacing	355 ton	3.00	3.00	2.50
11. Calcium chloride	4 ton	50.00	45.00	45.00
12. Plain cem. conc. pavmt., 6-in. uniform	1,978 s. y	2.50	2.70	2.75
13. Rein. cem. conc. pavmt., 8-in. uniform	2,294 s. y.	2.85	3.16	3.00
14. Rein. cem. conc. pavmt., 9-in. uniform	121,581 s. y.	2.99	3.16	3.15
15. Spec. rein. cem. conc. pavmt., 9-in. uniform	535 s. y.	3.50	3.60	4.25
16. Pl. cem. conc. wearing surf, bridge floor	2,634 s. y.	2.00	2.30	1.50
17. Bitum. surf. crse. stone aggr.	248 ton	8.00	9.50	9.00
18. Bitum. surf. crse., 2-in. uniform (CP-2)	5,376 s. y	1.10	1.10	1.00
19. Class A concrete	3,658 c. y.	37.00	36.00	43.00
20. Class B concrete	3,730 c. y.	25.00	26.00	28.00
21. Plain steel bars	1,059,703 lb.	.053	.05	.06
22. Plain structural steel	42,680 lb.	.07	.06	.06
23. Fabricated structural steel	80,200 lb.	.12	.17	.12
24. Stone backfill for structures	30 c. y.	8.00	3.80	6.00
25. Conc. test piles (4 piles, each 43-ft. long)	Lump Sum	1,720.00	950.00	750.00
26. 44-ft. concrete piles	264 l. f.	6.00	5.00	3.50
27. 38-ft. concrete piles	380 l. f.	6.00	5.00	3.50
28. 32-ft. concrete piles	508 l. f.	6.00	5.00	3.50
29. Pressure grout surfacing	184 s. y.	9.00	6.00	7.00
30. Mortared stone slope wall	620 c. y.	23.00	26.00	15.00
31. Mortared stone slope wall (spillway)	64 c. y.	30.00	26.00	20.00
32. Cl. B cem. conc. pavmt. for str. beds, 6-in. depth	11 c. y	30.00	20.00	40.00
33. Grouted rubble paving for stream beds	64 c. y.	20.00	22.00	25.00
34. Type F-1 endwalls, incl. rails	2 ea.	200.00	165.00	300.00
35. Type F-2 endwalls, incl. rails	15 ea.	200.00	150.00	190.00
36. Special A endwalls	2 ea.	200.00	115.00	175.00
37. Type D inlets	7 ea.	150.00	105.00	150.00
38. Type E inlets	18 ea.	125.00	85.00	140.00
39. Type G inlets	9 ea.	125.00	115.00	165.00
40. Type H inlets	8 ea.	125.00	200.00	175.00
41. 15-in. rein. cem. conc. pipe	1,020 l. f.	2.75	3.00	2.50
42. 18-in. rein. cem. conc. pipe	2,444 l. f.	3.50	4.00	3.25
43. 24-in. rein. cem. conc. pipe	2,022 l. f.	4.50	5.50	4.50
44. 30-in. rein. cem. conc. pipe	306 l. f.	6.50	8.50	6.25
45. 36-in rein. cem. conc. pipe	506 l. f.	7.00	7.00	6.00
46. 48-in. rein. cem. conc. pipe	126 l. f.	12.00	11.60	10.00
47. 72-in. rein. cem. conc. pipe	36 l. f.	21.00	21.70	25.00
48. 36-in. ext. str. rein. cem. conc. pipe	672 l. f.	7.50	7.70	6.5
49. 15-in. plain. cem. conc. or vit. clay pipe	234 l. f.	2,40	2.60	2.25
50. 24-in. plain. cem. conc. or vit. clay pipe	104 l. f.	3.90	5.10	4.00
51. 30-in. plain. cem conc. or vit. clay pipe	110 l. f.	6.00	7.90	6.00
52. 36-in plain. cem. conc. or vit. clay pipe	60 l. f.	6.50	6.60	6.00
53. 18-in. rein. conc. pipe relaid	42 l. f.	2.00	2.60	3.00
54. 4-in. tile underdrain	20,500 l. f.	1.00	1.10	1.00
55. 6-in. tile underdrain	180 l. f.	1.20	1.20	1.25
56. 4-in. tile found'n. underdrain, Type A	4,900 l. f.	.90	.95	1.00

(*Continued on page* 194)

HIGHWAY AND BRIDGES, PENNSYLVANIA (cont'd.)

57. 4-in. tile outlets	800 l. f.	.90	1.05	.75
58. 6-in. tile outlets	124 l. f.	1.20	1.15	1.00
59. White conc. reflecting curbing, Type A	428 l. f.	1.50	1.80	1.25
60. White conc. reflecting curbing, Type B	34,944 l. f.	1.55	1.90	1.50
61. Subgrade drains	25,300 l. f.	.50	.40	.60
62. Grouted rubble gutter	32 s. y.	5.00	5.75	5.00
63. Plain cem. conc. gutter, type C	807 s. y.	3.50	3.35	5.00
64. Guard posts	1,078 ea.	5.00	5.50	5.00
65. Shoulder baffle	8,192 l. f.	.25	28	.50
66. Shoulder trough	1,433 l. f.	1.00	60	1.50
67. 8-ft. dia. foundation columns	116 l. f.	50.00	56.00	55.00

HIGHWAYS AND BRIDGES MISSOURI

OWNER: Missouri State Highway Commission, Jefferson City; C. W. Brown, chief engineer.

PROJECT: Grading, excavation, culverts, bridges and concrete paving 0.712 miles of Route 40-TR in St. Louis County, near St. Louis city limits. Bridges are reinforced concrete structures located at Stations 960+13.88 and 2+05.51. Highway is dual lane Portland cement concrete pavement, each lane 24-ft. wide. Contractor was allowed alternate on cross-road culvert pipe and overall low bid was on basis of concrete pipe.

CONDITIONS: Contractor to furnish all materials and complete work in 90 working days. Rail and highway transportation facilities available. Wage rates range from 45c. for unskilled workers to $2.00 per hour for highly skilled. Bids were asked on roadway items and bridge items separately, and in combination. Award made to low bidder on the combination.

BIDS: Five bids were received July 7, 1944, on the roadway items ranging from $127,982 to $163,104. On the bridge items they ranged from $105,590 to $131,457. On the combination, the basis of the award, they ranged from $244,842 to $294,561.

LIST OF BIDDERS (Combined roadway and bridge items)

1. Israel Brothers, Clayton, Mo. (contract)	$244,842
2. Atkinson Windle Co., Inc., Chillicothe, Mo.	248,400
3. Massman Constr. Co., Kansas City, Mo.	274,956
4. R. B. Potashnick, Cape Girardeau, Mo.	275,045
5. Samuel Kraus Co., St. Louis, Mo.	294,561

Roadwork

LIST OF BIDDERS:

1. Atkinson Windle Co., Inc., Chillicothe, Mo.	$127,982
2. Israel Brothers, Clayton, Mo.	139,252
3. R. B. Potashnick, Cape Girardeau, Mo.	149,345
4. Massman Constr. Co., Kansas City, Mo.	154,538
5. Samuel Kraus Co., St. Louis, Mo.	163,101

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Class A excavation	27,505 c. y.	$0.48	$0.60	$0.55
2. Class 3 excavation (structures)	573 c. y.	4.00	3.00	4.00
3. Compacting embankment (rolling)	30,588 c. y.	.07	.20	.15
4. Compacting in cuts (rolling)	2,040 c. y.	.40	1.00	.15
5. Overhaul	9,520 ¼-mi. y.	.06	.10	.20
6. Removing pavement	133 s. y.	1.00	1.00	1.50
7. Removing 6-in. curb	147 l. f.	.75	1.00	1.00
8. Remove guard fence	400 l. f.	.25	.20	1.00
9. Broken stone (aggr. bkfill.)	1,165 c. y.	4.00	3.50	4.00
10. Screenings (aggr. bkfill.)	649 ton	3.00	2.25	3.00
11. Water (compacting, rolling)	5,873 hund.gal.	.02	.10	.50
12. Gravel or cr. stone surf	4 ton	4.00	3.00	5.00
13. Plain cement concrete pavement	29,288.7 s. y.	3.09	3.25	3.50
14. Cl. B concrete (other than box. culv.)	25.8 c. y.	60.00	60.00	50.00
15. 12-in. culvert pipe (X-road)	544 l. f.	1.75*	1.50†	1.75†
16. 15-in. culvert pipe (X-road)	108 l. f.	2.50*	2.00†	2.25†
17. 12-in. rein. conc. culv. pipe	326 l. f.	1.75	1.75	2.00
18. 18-in. rein. conc. culv. pipe	48 l. f.	2.75	2.50	4.00
19. Reinforcing steel	3,020 lb.	.07	.07	.10
20. Cl. A, type 1 or 3, underdrains	386 l. f.	2.50	2.50	2.00
21. Concrete protection curb	441.3 l. f.	3.50	3.50	5.00
22. 24-in. cobblestone gutter	150 l. f.	2.50	1.90	3.00
23. Cobblestone gutter	40 s. y.	5.00	3.75	5.00
24. 4-in. plain conc. sidewalk	399.7 s. y.	3.00	2.70	
25. Relocating barricades	1 ea.	60.00	25.00	
26. Steel grates and bearing plates	12,000 lb.	.20	.17	
27. Water, waterbnd. macad. base crse	22 hund. gal.	.75	1.20	
28. Coarse stone, waterbnd. mac. base crse	68 ton	5.00	2.85	
29. Screenings for base course	35 ton	5.00	2.90	
30. Manipulation and finishing	273 s. y.	50	.60	
31. Bitum. mat'l., penet. macad. surf	490 gal.	.25	.18	
32. Coarse aggregate, penet. macad. surf.	24 ton	5.00	2.90	
33. Seal coat aggregate, pen. mac. surf	7 ton	5.00	3.00	

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*Vitrified clay pipe. † Concrete pipe.

Bridges

LIST OF BIDDERS:

1. Israel Brothers, Clayton, Mo.	$105,
2. Atkinson Windle Co., Chillicothe, Mo.	120,
3. Massman Constr. Co., Kansas City, Mo.	120,
4. R. B. Potashnick, Cape Girardeau, Mo.	125,
5. Samuel Kraus Co., St. Louis, Mo	131,

Item	Quan.	Unit Prices (1)	(2)
1. Class 1 excav. for structures	1,390 c. y.	$3.00	$3.75
2. Porous backfill	300 c. y.	3.50	4.00
3. Class B concrete (handrail)	21.8 c. y.	100.00	46.00
4. Class B conc. (superstr., excl. handrail)	566.7 c. y.	45.00	42.85
5. Class B conc. (substructure)	718.6 c. y.	32.00	42.35
6. Fabr. structural steel (bearing plates)	13,530 lb.	.25	.3272
7. Fabr. wrought iron (scuppers)	360 lb.	.70	.90
8. Reinforcing steel	188,890 lb.	.07	.0671
9. 8-in. perf. vitr. clay pipe	290 l. f.	2.00	1.55
10. 8-in. vitr. clay sewer pipe	35 l. f.	1.50	1.15
11. Conduit system	Lump Sum	750.00	738.00
12. Cl. 1 excav., structures	1,485 c. y.	3.00	3.25
13. Porous backfill	49 c. y.	3.50	4.00
14. Class B concrete	673.7 c. y.	32.00	41.65
15. Reinforcing steel	83,550 lb.	.06	.07
16. Replace channel revetment	128 s. y.	2.00	5.50

HIGHWAY AND BRIDGES, MISSISSIPPI

OWNER: State Highway Dept. of Mississippi, Jackson.

PROJECT: Grading, drainage structures, bridges, and grav surface course on 20.085 miles of the Military Training Roa (known as access road to Mississippi Ordnance Plant), Flora Ordnance Plant, Madison County, Miss. Roadwa width is 16, 20, 24 and 26 ft.; width of surfacing is 10, 12 an 16 ft. Surfacing thickness at center, 1, 2 and 3 in. Sam thickness at sides.

CONDITIONS: Contractor to furnish all materials and complete work in 120 working days. Rail and highway transportation facilities available. Minimum wage rates are skilled labor, 75c.; semi-skilled, 40c.; common, 30c.

BIDS: Three bids were received April 18, 1944, ranging fro the contract low of $85,316 to $98,701.

LIST OF BIDDERS:

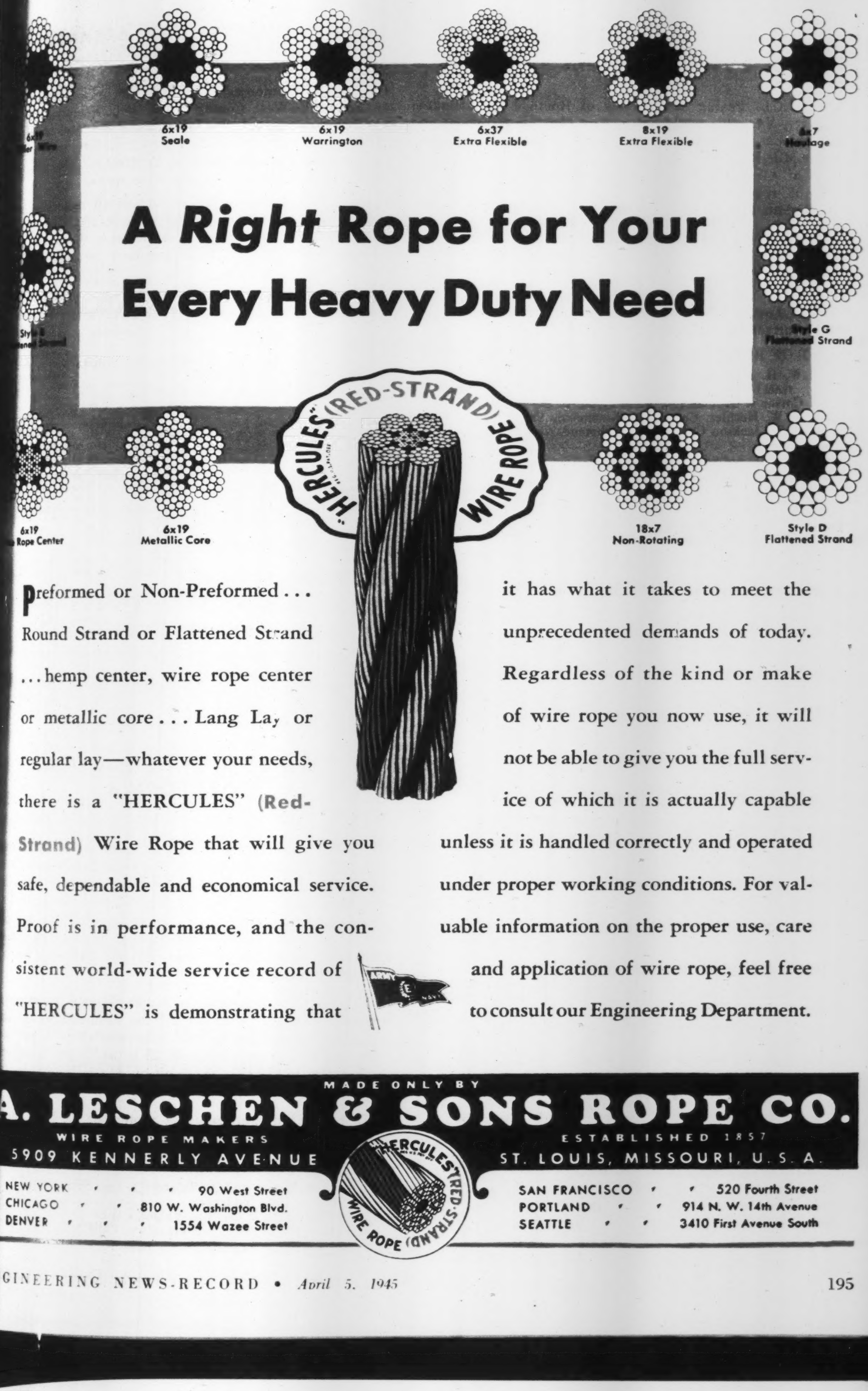
1. Memphis Stone & Gravel Co., Memphis, Tenn. (contract)	$85,31
2. E. W. Hable & Sons, Corsicana, Tex.	89,2
3. Cobb Bros. Constr. Co., Inc., Meridian, Miss.	98,70

Roadway

Item	Quan.	Unit Prices (1)	(2)
1. Remove old bridge (Sta. 240+27)	Lump Sum	$100.00	$75.00
2. Unclassified excavation	10,000 c. y.	.50	.60
3. Machine work	200 hr.	7.50	12.50
4. Gravel surface course (semi-gravel)	12,636 c. y.	3.20	3.20
5. 15-in. pipe culvert	78 l. f.	2.50	2.20
6. 18-in. pipe culvert	63 l. f.	3.00	3.20
7. 24-in. pipe culvert	156 l. f.	4.00	4.00
8. 30-in. pipe culvert	24 l. f.	5.00	6.00
9. 36-in. pipe culvert	24 l. f.	6.00	8.00
10. Class B culvert concrete	420.16 c. y.	29.00	32.50
11. Reinforcing steel	59,873 lb.	.06	.06

Bridges

Item	Quan.	Unit Prices (1)	(2)
12. Remove old bridge (Sta. 243+99.5)	Lump Sum	800.00	250.00
13. Remove old bridge (Sta. 99+66)	Lump Sum	200.00	100.00
14. Grave. surface course (semi-gravel) (ballast)	62 c. y.	3.20	3.20
15. Treated timber	47.725 Mbm.	195.00	200.00
16. Cl. B. box bridge concrete	162.79 c. y.	30.00	32.50
17. Reinforcing steel	22,390 lb.	.06	.06
18. Treated timber piling	2,050 l. f.	2.00	2.20
19. Test piles	2 ea.	200.00	200.00


6x19 Filler Wire
6x19 Seale
6x19 Warrington
6x37 Extra Flexible
8x19 Extra Flexible
6x7 Haulage
Style B Flattened Strand
Style G Flattened Strand
6x19 Wire Rope Center
6x19 Metallic Core
18x7 Non-Rotating
Style D Flattened Strand
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HIGHWAY AND BRIDGE, VIRGINIA

OWNER: Department of Highways, Commonwealth of Virginia.

PROJECT: Paving 1.502 miles of Route 1 in Arlington County, Va., with reinforced cement concrete pavement and bituminous concrete pavement. Also widening bridge over Four Mile Run near Alexandria. Project begins at north city line of Alexandria and extends northward. Bridge, at Sta. 99+65, requires two 20-ft. concrete slab spans. Bridge roadway width 42-ft., length 47½-ft.; one sidewalk of 5-ft. width.

CONDITIONS: Contractor to furnish all materials and complete work in 120 calendar days. Rail and highway transportation facilities available. Prevailing wage rates to be paid.

BIDS: Four bids were received May 2, 1944, ranging from the contract low $281,206 to $312,874.

LIST OF BIDDERS:

1. **W. H. Armstrong & Co.**, Washington, D. C. (contract)	$281,206
2. Corson & Gruman Co., Washington, D. C.	288,230
3. E. W. Hechler, Contractor, Richmond, Va.	301,626
4. B. W. Jackson Cont'g. Co., Richmond, Va.	312,874

Roadway

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Regular excavation	5,586 c. y.	$0.40	$0.60	$0.60
2. Borrow excavation	34,181 c. y.	.60	.80	.95
3. Concrete, Class A	33 c. y.	50.00	42.00	45.00
4. Concrete, Class C	22 c. y.	45.00	35.00	30.00
5. Metal reinforcement	3,299 lb.	.07	.08	.065
6. Pipe underdrains, 6-in	1,160 l. f.	.90	.90	.85
7. 15-in. concrete pipe	369 l. f.	2.75	3.00	2.50
8. 18-in. pipe	66 l. f.	3.25	3.20	2.80
9. 24-in. pipe	69 l. f.	6.25	4.80	4.50
10. 36-in. pipe	1,623 l. f.	7.00	7.00	7.00
11. 6-in. pipe (concrete)	69 l. f.	.60	1.50	.85
12. 12-in. pipe (concrete)	18 l. f.	2.50	3.00	2.00
13. Tee joints (36" tee, 15" butt)	3 ea.	30.00	40.00	45.00
14. Tee joint (36" tee, 18" butt)	1 ea.	30.00	40.00	45.00
15. 6-in., 90-deg. ell joint	1 ea.	1.00	3.00	5.00
16. Pipe (relaid)	86 l. f.	2.00	4.50	2.25
17. Manhole (special design)	1 ea.	400.00	360.00	250.00
18. Curb drop inlets (complete)	11 ea.	100.00	75.00	100.00
19. Curb catchbasins	9 ea.	125.00	80.00	150.00
20. Subgrade material (6-in. stab. grav. base)	4,283 c. y.	1.50	2.60	1.90
21. Subgrade material (patching)	517 c. y.	2.50	3.00	2.00
22. Plain combination cem. conc. curb. and gutter (6x14-in. curb, 2'8" gutter)	14,180 l. .f.	1.50	1.65	1.60
23. Radial comb. cem. conc. curb. and (6x14" curb, 2'8" gutter)	224 l. f.	2.00	2.50	1.80
24. As above, 6x14"curb, 2'x'1½'x8"gutter	47 l. f.	2.00	2.50	2.00
25. Rad. cem. conc. gutter (3½'x8")	12 l. f.	2.00	2.50	2.00
26. Plain cem. conc. gutter (2'x4")	11 l. f.	2.00	2.00	1.20
27. Rad. cem. conc. curb (6"x14")	616 l. f.	1.00	1.10	1.00
28. Plain cem. conc. curb (6"x18")	680 l. f.	1.00	1.15	.80
29. Cem. conc. entrance, 8-in. (HES)	1,708 s. y.	3.40	3.60	3.50
30. Remove concrete pavement	1,918 s. y.	.60	.40	.50
31. Concrete patching, 8-in. (HES)	3,100 s. y.	3.80	4.10	4.50
32. Reflect. advance warning signs	2 ea.	30.00	15.00	60.00
33. Remove and reset steel fence	1,262 l. f.	.60	1.50	1.20
34. Reset F. A. project marker	1 ea.	2.00	5.00	2.00
35. State project markers	2 ea.	4.00	5.00	5.00
36. Piling (untreated)	800 l. f.	2.00	2.00	1.50
37. Cement conc. sidewalk, 4-in.	3,196 s. y.	1.90	2.00	2.10
38. Barrier curb (7"x20")	1,400 l. f.	1.25	1.20	1.20
39. Concrete median strip (3'x6")	233 s. y.	4.00	3.00	2.80
40. Lumber (storm sewer mat)	6 Mbm.	150.00	80.00	120.00
41. Remove, reset wire fence	654 l. f.	.60	1.50	1.20
42. Stab. gravel base (entrance)	90 c. y.	2.50	4.00	2.50
43. Cement concrete, Class X (HES) (irreg.)	1,462 c. y.	11.50	12.00	12.50
44. Rein. cem. conc. pavement, 8-in.	27,554 s. y.	2.85	2.80	2.85
45. Hot bitum. conc. surf. course	3,261 ton	8.00	7.20	8.10
46. Hot bitum. conc. base course	4,241 ton	8.00	7.00	8.10
47. Hot bitum. conc. base crse. (irreg.)	416 ton	8.00	7.50	8.10

Bridge Widening

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Class A concrete	51.9 c. y.	$45.00	$62.00	$45.00
2. Reinforcing steel	6,120 lb.	.07	.08	.065
3. Hot bitum. conc. surface course	17.6 ton	8.00	8.00	8.10
4. Hot bitum. conc. base crse	7.1 ton	8.00	8.00	8.10
5. Hot bitum. conc. base crse. (irreg.)	40 ton	8.00	7.50	8.10
6. Class A concrete (substructure)	4.5 c. y.	45.00	30.00	45.00
7. Class B concrete (substructure)	193 c. y.	40.00	24.00	40.00
8. Excavation, Type A (substructure)	31 c. y.	4.00	4.50	4.00
9. Excavation, Type B (substructure)	122 c. y.	25.00	20.00	25.00
10. Timber piles (untreated), substr.	2,100 l. f.	1.50	1.85	1.50

HIGHWAY BRIDGE, ARKANSAS

OWNER: Arkansas State Highway Dept., Little Rock.

PROJECT: Reinforced-concrete bridge over Illinois Ba on Scottsville-West County Road, Pope County, Ark. reinforced-concrete deck girder spans and steel truss sp are included in the 403-ft. long structure. Steel truss span be moved from another location. Contract includes remova existing spans and erecting the truss spans.

CONDITIONS: Contractor to furnish all materials exc steel truss spans and complete work in 180 working d Highway transportation facilities available. Wage rates sp fied are: skilled labor, $1.00 per hour; semi-skilled, 6 and common labor, 40c.

BIDS: Three bids were received March 28, 1944, rang from the contract low of $35,717 to $45,274.

LIST OF BIDDERS:

1. **A. C. Campbell Co.**, Shreveport, La. (contract)	$35,
2. **Reynolds & Sutton**, Tyler, Tex	41,
3. J. P. McNulty, Pine Bluff, Ark	45,

Item	Quan.	Unit Prices (1)	(2)
1. Geubbing	2.6 ac.	$100.00	$150.00
2. Clearing	1.7 ac.	100.00	100.00
3. Solid rock excavation	179 c. y.	5.00	2.50
4. Common excavation	1,122 c. y.	.60	.80
5. Dry excavation for structures	162 c. y.	2.50	5.00
6. Wet excavation for structures	94 c. y.	8.00	15.00
7. Solid rock excav., structures	47 c. y.	10.00	20.00
8. Embankment material	8,352 c. y.	.65	.80
9. Class A conc. for bridges	136.87 c. y.	35.00	50.00
10. Class S conc. for bridges	156.20 c. y.	35.00	50.00
11. Reinforcing steel	42,607 lb.	.065	.07
12. Concrete piling	486 l. f.	5.00	7.00
13. Concrete railing	414 l. f.	5.00	2.50
14. Metal bearing and roadway expansion devices	4,254 lb.	.24	.25
15. Untreated bridge timber	9.636 Mbm.	150.00	150.00
16. Treated bridge timber	11.2 Mbm.	210.00	225.00
17. Class A. concrete	3.36 c. y.	50.00	40.00
18. Class B concrete	1.88 c. y.	50.00	40.00
19. Reinforcing steel	432 lb.	.10	.10
20. 24-in. rein. conc. pipe culvert	32 l. f.	4.00	4.00
21. Riprap	265 c. y.	9.00	3.50
22. Remove exist. bridge and erecting truss spans	Lump Sum	1,500.00	1,500.00

BRIDGE RECONSTRUCTION, CALIFORNIA

OWNER: California State Division of Highways, Sacrament

PROJECT: Reconstructing a portion of the existing brid across the Sacramento River at Rio Vista, Sacramento Count Calif. Involves necessary excavation; roadway surfacin furnishing and driving both timber and steel piles; furnishin and erecting required structural steel; furnishing and pla ing steel reinforcing bars; steel railing; electrical equipment and other miscellaneous items of work necessary for com pletion of project.

CONDITIONS: Contractor to furnish all materials except tw electrolier standards, which will be furnished by the state Highway transportation facilities available. Wage rate specified are: skilled labor, $1.25 to $1.75 per hour; semi skilled, 90c. to $1.3125; and common, $1.00. Preference ratin AA-3.

BIDS: Nine bids were received September 13, 1944, rangin from the low of $727,858 to $812,963.

LIST OF BIDDERS:

1. Lord & Bishop and A. Teichert & Co., Sacramento, Calif., (low bidder)	$727,8
2. C. W. Calletti & Co., San Rafael, Calif.	733,4
3. J. H. Pomeroy, Inc., San Francisco, Calif.	745,7

(Continued on page 197)

BRIDGE RECONSTRUCTION, CALIFORNIA (cont'd.)

Earle W. Heple, San Jose, Calif.	746,680
United Concrete Pipe Corp., and Ralph A. Bell, Los Angeles, Calif.	747,375
W. A. Bechtel & Co., San Francisco, Calif.	755,127
A. Soda & Son, Oakland, Calif.	764,985
George Pollock Co., Sacramento, Calif.	772,472
Morrison-Knudsen Co., Los Angeles, Calif.	812,936

Item	Quan.	Unit Prices (1)	(2)	(3)
ructure excavation	2,500 c. y.	$10.00	$25.00	$30.00
ported borrow	4,400 c. y.	1.25	2.00	2.25
rnish and apply water	200 M gal.	2.00	4.00	2.00
sher run base	575 ton	4.00	4.00	4.00
neral aggregate plant-mix surf.	600 ton	5.00	6.00	6.00
asph. MC-3 plant-mix surfacing	32 ton	20.00	40.00	30.00
asph., MC-3 prime coat	4 ton	40.00	40.00	55.00
ck and screenings for bitum. macadam	60 ton	7.00	10.00	8.00
ving asphalt, bituminous macadam	5 ton	30.00	40.00	25.00
uglas fir timber	74 Mfbm.	200.00	200.00	170.00
A portland cement conc.; footing blocks	1,015 c. y.	30.00	30.00	22.00
ss A portland cement; structures	2,090 c. y.	40.00	42.00	32.00
rnish structural steel	328,500 lb.	.08	.075	.08
ect structural steel	328,500 lb.	.05	.037	042
rn. treated Douglas fir piles	6,000 l. f.	1.50	1.50	1.50
ive timber piles	75 ea.	50.00	100.00	70.00
rnish steel piles	19,040 l. f.	2.50	2.00	2.50
ive steel piles	406 ea.	40.00	100.00	80.00
riction fins	350 ea.	10.00	10.00	12.00
rnish bar reinforcing steel	320,000 lb.	.04	.04	04
ace reinforcing steel	320,000 lb.	.025	.02	02
el railing	2,722 l. f.	9.00	8.00	9.00
ectric equipment	Lump Sum	4,000.00	2,500.00	4,200.00
isc. items of work	Lump Sum	5,000.00	10,135.00	2,200.00

VERPASS AND APPROACHES, UTAH

NER: Utah State Road Commission, Salt Lake City, A. L. lerson, State road engr.

OJECT: Construction of concrete T-beam overpass struc- 273.6 ft. long and 0.644 miles of approach-road surfac- 26-ft. wide, on Plain City-Hot Springs Road, Box Elder nty, approximately 12 miles northwest of Ogden, Utah. proach-road surfacing is road-mixed bituminous material.

NDITIONS: Contractor to furnish all materials and com- te work on overpass in 150 calendar days and on road in calendar days. Rail and highway transportation facilities ilable. Wage rates are: skilled labor, $1.25 to $1.50 per r; semi-skilled, $1.00 to $1.12½; and common, 75c.

DS: Six bids were received June 23, 1944 on the overpass ucture, and six on the roadway items. Overpass bids ranged m contract low of $57,690 to $83,735. Engineers estimate, ,481. On the roadway, bids ranged from $66,968 to $79,- . Engineers estimate, $65,733.

Roadway

ST OF BIDDERS:

1. Olof Nelson Constr. Co., Logan, Utah (contract)	$66,968
2. R. M. Jensen Constr. Co. Salt Lake City, Utah	69,245
. H. W. Glenn, Midvale, Utah	72,624
. W. W. Clyde & Co., Springville, Utah	72,854
. Reynolds Constr. Co., Springville, Utah	79,217
. L. A. Young Constr. Co., Richfield, Utah	79,424

Item	Quan.	Unit Prices (1)	(2)	(3)
Bituminous material, type MC-2	17,500 gal.	$0.09	$0.10	$0.15
Bituminous material, type RC-5	2,900 gal.	.09	.10	.16
Cover material	140 ton	3.00	3.00	4.00
Scarifying and mixing	0.592 mi.	750.00	800.00	1,800.00
Scarifying and mixing paved shoulder and embankment gutter, 9-ft. wide	0.311 mi.	750.00	1,200.00	1,800.00
Cr. rock or cr. gravel surf. course	5,150 ton	.85	.85	1.00
Gravel or cr. rock base course	4,700 ton	.85	.85	1.00
Unclassified excavation	116,300 c. y.	.22	.23	.20
Overhaul, Class A	705,000 sta. y.	.015	.015	.02
10. Overhaul, Class B	57,000 y. mi.	.15	.15	.13
11. Channel excavation	75 c. y.	1.00	1.25	.50
12. Watering	1,830 M gal.	1.50	1.50	1.50
13. Rolling	1,565 hr.	3.50	4.00	4.00
14. 18-in. concrete pipe	87 l. f.	3.00	2.50	4.00
15. Excavation for structures	50 c. y.	1.00	1.50	1.50
16. Guide posts	54 ea.	5.00	6.00	4.00
17. Right-of-way fence, type A	2,100 l. f.	.20	.16	.13
18. Moving fence	250 l. f.	.15	.10	.08
19. Removal of existing pavement	2,000 s. y.	.75	.75	.75
20. 16-ft. gates	3 ea.	25.00	25.00	25.00
21. Federal-aid project markers	2 ea.	20.00	20.00	20.00

Overpass Structure

LIST OF BIDDERS:

1. S. E. Faddis Constr. Co., Salt Lake City, Utah (contract)	$57,690
2. Merrill & Lauch Constr. Co., Ogden, Utah	65,570
3. Young & Smith, Salt Lake City, Utah	72,761
4. Olof Nelson Constr. Co., Logan Utah	76,352
5. L. A. Young Constr. Co., Richfield, Utah	77,736
6. Ora Bundy & Co., Ogden, Utah	83,735

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation for structures	450 c. y.	$2.30	$4.00	$4.00
2. Concrete, Class A	1,210 c. y.	28.00	30.00	34.00
3. Concrete handrail	596 l. f.	4.00	7.50	6.00
4. Structural steel	3,500 lb.	.26	.20	25
5. Reinforcing steel	235,000 lb.	055	.055	07
6. Piling, treated	4,200 l. f.	1.43	2.00	1.80
7. 6-in. perf. corr. galv. metal pipe underdrains	92 l. f.	73	1.25	2.00
8. 6-in. corr. galv. metal pipe	288 l. f.	72	1.25	2.00
9. Furn. pile driving equipment	Lump Sum	275.00	500.00	600.00

RAISING BRIDGE, INDIANA

OWNER: Indiana State Highway Commission, Indianapolis.

PROJECT: Raising steel girder structure and railroad tracks, and paving approaches at underpass where New York Central Railroad tracks pass over State Road No. 30, Fort Wayne, Allen County, Ind.

CONDITIONS: Contractor to furnish all materials and complete work in 150 calendar days. Rail and highway transportation facilities available. Reported wage rates are: skilled labor, $1.00; semi-skilled, 75c.; common, 65c.

LIST OF BIDDERS: (Engineer's estimate, $28,991)

1. L. W. Dailey Constr. Co., Fort Wayne, Ind. (contract)	$28,028

Item	Quan.	Unit Prices (1)	(2)*
1. Class D concrete	99 c. y.	$50.00	$50.00
2. Special filling material	200 c. y.	3.00	2.00
3. Structural steel	9,620 lb.	.22	.25
4. Reinforcing steel	1,464 lb.	.10	.08
5. Reinforced concrete pavement	794 s. y.	4.00	4.00
6. Remove present structure (portions)	Lump Sum	750.00	800.00
7. Excavation, unclassified	115 c. y.	4.00	4.00
8. Raising bridge	Lump Sum	2,000.00	2,500.00
9. Pavement removal	794 s. y.	1.00	.75
10. Concrete sidewalk	15 s. y.	3.00	2.50
11. Adjusting manhole to grade	1 ea.	25.00	20.00
12. Remove portion present drainage system	Lump Sum	150.00	500.00
13. Rivets removed	34 ea.	1.00	1.00
14. Holes drilled	48 ea.	2.00	1.00
15. Unloading and placing embankment	800 c. y.	1.20	1.25
16. Unload and spread cinder ballast	600 c. y.	1.00	1.00
17. Raising and surfacing main track (6½-in. lifts)	1,740 l. f.	1.20	1.50
18. Raising and surfacing side tracks (6½-in. lifts)	890 l. f.	1.50	1.50
19. Replacing cross ties	80 ea.	3.00	1.20
20. Timber furnished	9.71 Mbm.	260.00	250.00
21. Grillage rails fabricated and erected	6.6 ton	100.00	150.00
22. Membrane waterproofing, Type A	250 s. f.	.30	.40
23. Membrane waterproofing, Type D	250 s. f.	.30	.60
24. 1½-in. mastic waterproofing	60 s. f.	.60	.40
25. 8-in. vitrified clay pipe	8 l. f.	2.00	1.00
26. 12-in. vitrified clay pipe	42 l. f.	2.50	1.50
27. 18-in. vitrified clay pipe	52 l. f.	4.00	2.75
28. 6-in. perf. vitr. clay pipe	427 l. f.	1.50	1.25
29. 8-in. perforated cast iron pipe	52 l. f.	2.80	3.50
30. Stone ballast	8 c. y.	4.10	4.00
31. Std. catch basin, Type C1	4 ea.	125.00	125.00
32. Manholes, Type B2	1 ea.	250.00	200.00
33. Special catch basin	1 ea.	250.00	300.00
34. Aggregate for subsurface drains	30 c. y.	4.00	2.00
35. Installing rail supports	Lump Sum	1,200.00	1,000.00
36. Standard signs (4x4-ft.)	12 ea.	30.00	30.00
37. Standard barricades	2 ea.	50.00	60.00
38. Sign standards	2 ea.	50.00	25.00
39. Porous backfill	16 c. y.	4.00	4.00

* *Engineer's estimate*

WATERWORKS SYSTEM, BUCYRUS, OHIO

OWNER: City of Bucyrus, Ohio; W. F. Pfleiderer, Dir. of Public Service; Floyd G. Browne & Assoc., consulting engineers.

PROJECTS: Construction 500,000 gallon concrete clear well and connecting piping at site of present waterworks plant (Contract 1), and water distribution system consisting of cast iron pipe mains, fittings, valves, hydrants and all necessary appurtenances for the City of Bucyrus, Ohio (Contract 2). Contractor to make proper connections to the distribution system and to pipelines and other structures.

CONDITIONS: Contractor to furnish all materials and complete all work, including final clean-up in 150 calendar days. Rail and highway transportation facilities available. Wage rates specified are: skilled labor, $1.375 to $1.675 per hour; semi-skilled labor 82½c. to $1.375; and common, 80 to 90c. Alternates were allowed in Contract 1 for the use of brick or concrete manholes; and on Contract 2 for use of cement asbestos pipe or cast iron pipe. Contract let on basis of cast iron pipe.

BIDS: Five bids were received on Contract 1 (brick manhole) on November 29, 1945 ranging from the contract low of $27,496 to $40,860. On Contract 2 (cast iron pipe alternate) bids taken on the same day ranged from $127,343 to $150,820.

LIST OF BIDDERS: (Brick manhole alternate)

1. Drainage Contractors, Inc., Detroit, Mich. (contract)	$27,496
2. Roger J. Au, Port Clinton, Ohio	36,748
3. C. H. Leach Co., Inc., Bellefountaine, Ohio	38,741
4. State Construction Co., Cleveland, Ohio	40,063
5. Midstate Constr. Co., Fort Wayne, Ind.	40,860

Contract No. 1—Clear Well and Piping

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation	3,100 c. y.	$1.00	$1.50	$2.00
2. Foundation cushion	50 c. y.	3.00	4.00	3.50
3. Concrete	600 c. y.	20.00	30.00	34.00
4. Additional Portland cement	10 bbl.	3.00	2.50	2.60
5. Steel reinforcement	40 ton	110.00	110.00	96.00
6. Cast iron pipe, b. & s.	19 ton	106.00	150.00	00.00
7. Cast iron pipe fittings, b. & s.	3.5 ton	170.00	250.00	180.00
8. Flanged cast iron pipe	1.5 ton	250.00	200.00	190.00
9. Flanged standard fittings	2.5 ton	275.00	375.00	240.00
10. Special c. i. pipe fittings	0.5 ton	300.00	400.00	240.00
11. 10-in. gate valves	2 ea.	90.00	90.00	155.00
12. 12-in. gate valves	2 ea.	115.00	115.00	150.00
13. 16-in. gate valves	2 ea.	230.00	225.00	250.00
14. 18-in. gate valves	2 ea.	300.00	350.00	275.00
15. Adjustable valve boxes and covers	2 ea.	12.00	15.00	20.00
16. Miscellaneous iron work	400 lb.	.25	.15	.15
17. Ait relief valve assemblies	7 ea.	75.00	70.00	60.00
18. Brick manholes and covers	9 ea.	125.00	130.00	185.00
19. Concrete manholes and covers (alt.)	9 ea.	125.00	150.00	200.00
20. Water meter and equipment	Lump Sum	750.00	1,000.00	720.00

Contract No. 2—Distribution Mains

LIST OF BIDDERS: (Cast Iron Pipe Alternate)

1. C. H. Leach Co., Inc., Bellefountaine, Ohio (contract)	$127,343
2. Drainage Contractors, Inc., Detroit, Mich.	132,133
3. Roger J. Au, Port Clinton, Ohio	135,332
4. R. P. Kuehn, Mansfield, Ohio	145,284
5. Mike Fatol, Galion, Ohio	145,731
6. State Construction Co., Cleveland, Ohio	148,110
7. L. Walker Fauber, Ashland, Ohio	150,820

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Additional earth excavation	250 c. y.	$2.50	$2.00	$2.00
2. Special tamping	150 l. f.	1.00	2.00	.50
3. Concrete	30 c. y.	20.00	30.00	20.00
4. Additional steel reinforcement	1,000 lb.	.06	.10	.10
5. 4-in. b. & s. cast iron pipe	14 l. f.	2.65	2.50	2.10
6. 6-in. b. & s. cast iron pipe (alt.)	1,475 l. f.	2.50	2.70	3.00
7. 8-in. b. & s. cast iron pipe (alt.)	600 l. f.	3.25	3.10	3.60
8. 10-in. b. & s. cast iron pipe (alt.)	3,000 l. f.	3.65	3.20	4.30
9. 12-in. b. & s. cast iron pipe (alt.)	11,200 l. f.	4.10	3.70	4.60
10. 16-in. b. & s. cast iron pipe	3,100 l. f.	5.75	5.00	5.20
11. 18-in. b. & s. cast iron pipe	760 l. f.	7.00	8.00	
12. Cast iron pipe fittings, b. & s.	28 ton	150.00	180.00	
13. 16-in. mechanical joint c. i. pipe	250 l. f.	10.00	15.00	
14. 6-in. cement asbestos pipe (alt.)	1,475 l. f.	2.20	2.53	
15. 8-in. cement asbestos pipe (alt.)	600 l. f.	3.00	2.82	
16. 10-in. cement asbestos pipe (alt.)	3,000 l. f.	3.40	2.99	
17. 12-in. cement asbestos pipe (alt.)	11,200 l. f.	3.75	3.43	
18. 4-in. gate valves	1 ea.	19.00	20.00	
19. 6-in. gate valves	34 ea.	28.00	30.00	
20. 8-in. gate valves	1 ea.	50.00	50.00	
21. 10-in. gate valves	5 ea.	70.00	70.00	
22. 12-in. gate valves	17 ea.	90.00	90.00	
23. 16-in. gate valves	6 ea.	190.00	175.00	
24. 18-in. gate valves	3 ea.	260.00	250.00	
25. Adjustable valve boxes and covers	66 ea.	10.00	12.00	
26. Hydrants	31 ea.	100.00	100.00	
27. Relocating existing hydrants	2 ea.	50.00	40.00	
28. Miscellaneous iron work	500 lb.	.30	.20	
29. 24-in. corrugated culvert pipe	200 l. f.	10.00	25.00	
30. 30-in. corrugated culvert pipe	65 l. f.	20.00	27.00	
31. Brick Masonry	100 c. f.	2.00	1.00	
32. ¾-in. lead service lines	850 l. f.	2.00	1.30	
33. ¾-in. copper service lines	850 l. f.	1.65	1.25	
34. 1-in. lead service lines	75 l. f.	2.60	1.60	
35. 1-in. copper service lines	75 l. f.	2.25	1.50	
36. 2-in. lead service lines	50 l. f.	4.50	2.50	
37. 2-in. copper service lines	50 l. f.	4.00	2.40	
38. ¾-in. curb cocks for lead	20 ea.	3.85	5.00	
39. ¾-in. curb cocks for copper	20 ea.	3.50	4.70	
40. 1-in. curb cocks for lead	5 ea.	4.75	6.00	
41. 1-in. curb cocks for copper	5 ea.	4.00	5.70	
42. 2-in. curb cocks for lead	5 ea.	15.00	15.00	
43. 2-in. curb cocks for copper	5 ea.	14.00	13.50	
44. ¾-in. corporation cocks for lead	185 ea.	3.10	6.50	
45. ¾-in. corporation cocks for copper	185 ea.	3.00	6.30	
46. 1-in. corporation cocks for lead	10 ea.	3.70	7.20	
47. 1-in. corporation cocks for copper	10 ea.	3.50	7.00	
48. 2-in. corporation cocks for lead	10 ea.	14.00	14.00	
49. 2-in. corporation cocks for copper	10 ea.	12.00	12.50	
50. ¾-in. adapters	350 ea.	.80	3.50	
51. 1-in. adapters	10 ea.	1.00	3.60	
52. 2-in. adapters	5 ea.	4.00	5.00	
53. ¾-in. unions	40 ea.	2.00	.50	
54. 1-in. unions	5 ea.	3.00	1.00	
55. 2-in. unions	5 ea.	5.00	3.00	
56. Extension service boxes	20 ea.	4.00	8.00	
57. Relocate exten. serv. boxes	26 ea.	6.00	5.00	
58. Restore brick pavmt., stone base	3,700 s. y.	2.00	3.50	
59. Restore brick pavmt., conc. base	625 s. y.	4.00	5.00	
60. Restore tar bound macadam pavmt.	150 s. y.	1.50	3.00	
61. Restore concrete pavements	325 s. y.	4.00	4.00	
62. Black-top paving	350 s. y.	2.00	4.00	
63. Restoring sidewalks	1,100 s. f.	.30	.40	
64. Restore curb and gutter	265 l. f.	1.75	1.50	
65. Restore concrete driveways	125 s. y.	3.00	4.00	
66. Restore brick driveways	25 s. y.	3.00	5.00	
67. Stone, No. 46	250 c. y.	2.50	3.00	

WATER MAIN, CLEVELAND, OHIO

OWNER: City of Cleveland, J. H. Hamlin, engineer.

PROJECT: Furnishing pipe and constructing 42-in. ste water main for Spruce Avenue Water Main, Cleveland, Ohi Also involves salvaging approximately 830 ft. of 42-in. ca iron water main as specified by the engineer.

CONDITIONS: Contractor to furnish all steel pipe and complete that portion of the work in 30 calendar days. Thirt days also allowed for salvaging cast iron pipe. Rail, highwa and water transportation facilities available to Cleveland, an highway facilities available to site of work. Wage rates specified are: hoisting engineers, $1.875 per hour; and commo labor, $1.035 per hour.

BIDS: Nine bids were received April 28, 1944 ranging fro the low of $55,596 to $107,800.

LIST OF BIDDERS:

1. Lake City Constr. Co. Shaker Heights, Ohio (low bidder)	$55,59
2. Kalill Co., Cleveland, Ohio	60,86
3. Domenic Nero Constr. Co., Cleveland, Ohio	63,12
4. D. M. Sylvester & P. DiPaolo Constr. Co., Cleveland, Ohio	64,36
5. National Construction Co., Cleveland, Ohio	67,58
6. Herkner Constr. Co., Cleveland, Ohio	73,46
7. Said S. Haddad, Cleveland, Ohio	84,38
8. Fred Haddad, Cleveland, Ohio	92,46
9. Curro Construction Co., Cleveland, Ohio	107,80

Item	Quan	Unit Prices (1	(2)	(
1. Furnish and construct 42-in. steel water main	1,140 l. f.	$44.00	$46.95	$51.0
2. Salvage 42-in. cast iron water main	830 l. f.	6.00	8.85	6.0

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WATERMAINS, DALLAS, TEX.

OWNER: City of Dallas, Tex.

PROJECT: Construction of 6-in. to 24-in. cast iron watermains and appurtenances, and pump house modification and addition in connection with the extension of the Dallas, Tex., water supply system. (Contract 6.) Involves the furnishing and laying of cast iron watermains; necessary valves and fittings; concrete for structures; gravel backfilling; replacing brick, concrete, asphalt, and surface treated pavement; fire hydrants; railroad crossing; pump house modification and addition; and sanitary sewer crossing.

CONDITIONS: Contractor to furnish all material and complete work in 150 calendar days. Project includes salvaging of 1,815 feet of 6-in. cast iron pipe. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.50 to $1.62½ per hour; semi-skilled, $1.00; and common labor, 55c.

BIDS: Thirteen bids were received April 19, 1944, ranging from the low of $333,783 to $508,438.

LIST OF BIDDERS:

1. Fred Dellone Constr. Co., **Dallas, Tex. (low bidder)**	$333,783
2. M. F. Fischer & Son, San Antonio, Tex.	340,613
3. Ben Sira & Co., Dallas, Tex.	342,927
4. P. C. Sorenson Co., Dallas, Tex.	345,246
5. Dalton & Cullum, Dallas, Tex.	358,066
6. E. H. Reeder Constr. Co., Dallas, Tex.	379,361
7. Williams & Whittle, Inc.	396,337
8. Sherman Machine & Iron Works, Oklahoma City, Okla.	399,060
9. Leland Fikes, Dallas, Tex.	406,065
10. B. & M. Constr. Co., Oklahoma City, Okla.	409.297
11. Claud Everett, Inc., Houston, Tex.	434,944
12. Ransdell Constr. Co., Pharis, Tex.	445,948
13. F. S. Oldt Co., Dallas, Tex.	508,438

Item	Quan.	Unit Prices (1)	(2)	(3)
1. 24-in. c. i. water main, Cl. 150 b&s	2,358 l. f.	$8.60	$8.51	$9.15
2. 20-in. c. i. water main, Cl. 150 b&s	9,774 l. f.	6.75	6.97	7.10
3. As above, Class 150 Mech. Joint	64 l. f.	8.00	7.34	6.50
4. 16-in. c. i. water main, Cl. 150 b&s	31,680 l. f.	5.20	5.65	5.55
5. As above, Class 150 Mech. Joint	176 l. f.	6.50	5.94	5.00
6. 12-in. c. i. water main, Cl. 150 b&s	896 l. f.	3.50	4.52	4.20
7. 10-in. c. i. water main, Cl. 150 b&s	12 l. f.	3.00	3.50	3.00
8. 8-in. c. i. water main, Cl. 150 b&s	36 l. f.	2.50	3.00	2.50
9. 6-in. c. i. water main, Cl. 150 b&s	360 l. f.	2.00	2.00	2.00
10. 4-in. c. i. water main, Cl. 150 b&s	12 l. f.	1.50	1.50	1.50
11. 24-in. gate valves	3 ea.	1,160.00	635.00	1,000.00
12. 20-in. gate valves	7 ea.	880.00	458.00	800.00
13. 16-in. gate valves	29 ea.	170.00	162.50	200.00
14. 12-in. gate valves	5 ea.	110.00	92.00	120.00
15. 10-in. gate valves	1 ea.	100.00	71.00	90.00
16. 8-in. gate valves	10 ea.	55.00	45.15	60.00
17. 6-in. gate valves	42 ea.	38.00	32.00	40.00
18. 4-in. gate valve	1 ea.	30.00	21.97	30.00
19. C. I. special fittings, 400-ft. W. P.	57.1 ton	178.00	250.00	200.00
20. Air relief valves	6 ea.	570.00	140.00	400.00
21. Blow-off manhole	1 ea.	500.00	102.00	400.00
22. Class A concrete	32.3 c. y.	35.00	28.00	40.00
23. Class C concrete	25 c. y.	10.00	18.00	20.00
24. Salvaging 6-in. c. i. pipe	1,815 l. f.	.50	.85	.25
25. Gravel backfill	20 c. y.	5.00	3.50	3.00
26. Replacing brick pavement	27 s. y.	5.00	4.65	4.00
27. Replacing concrete pavement	177 s. y.	4.00	2.80	2.50
28. Replacing asphalt pavement	4,299 s. y.	3.50	2.75	2.50
29. Replace surface treated pavement	8,164 s. y.	2.20	2.00	1.80
30. Fire hydrants	14 ea.	90.00	95.00	100.00
31. Gulf, Colo. & Santa Fe R. R. crossing	Lump Sum	1,600.00	882.00	1,600.00
32. Pump house modification, addition	Lump Sum	4,400.00	5,205.00	6,750.00
33. Sanitary sewer crossing	270 l. f.	8.00	1.60	2.00

WATER SUPPLY SYSTEM BIG SPRING, TEXAS

OWNER: City of Big Spring, Tex.; Freese & Nichols, Fort Worth, engineers.

PROJECT: Construction of water supply system for city of Big Spring, Tex., including the developing of eight water wells, both straight wall wells and gravel pack water wells (Contract 1); furnishing and installing eight water well pumps and appurtenances (Contract 2); and construction of water supply main and well collecting system (Contract 3).

CONDITIONS: Contractor to furnish all materials and co plete each of the three contracts in 70 days. Rail and high transportation facilities available. Wage rates are: skil labor, $1.12½ to $1.50 per hour; semi-skilled, 60c. to $1. and common, 50c.

BIDS: Five bids were received on Contract 1, three on C tract 2, and fourteen on Contract 3. Awards in each case w made to the low bidder. Bids on Contracts 1 and 3 w opened June 19, 1944, and on Contract 2 on June 7, 19 Tabulation of bids of the three low bidders and the compl list of bidders is given below.

Contract 1—Developing Water Wells

LIST OF BIDDERS: (Opened June 19, 1944)

1. George L. Taylor, Plainview, Tex. (contract)	$37,
2. Alide Wells Co., Denver, Colo	39,
3. Kent & Preston, Fort Worth, Tex	41,
4. J. B. Ewing, Big Spring, Tex	43,
5. Layne Texas Co., Ltd., Dallas, Tex	47,

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Straight wall well No. 1	1 ea.	$2,277.14	$2,645.72	$2,50
2. Gravel pack water well No. 2	1 ea.	3,441.38	3,426.72	3,40
3. Gravel pack water well No. 4	1 ea.	5,331.73	5,456.88	5,95
4. Gravel pack water well No. 7	1 ea.	4,991.63	5,010.72	5,20
5. Straight wall well, selected location	1 ea.	3,226.90	3,690.72	3,50
6. Gravel pack well, selected location	3 ea.	5,052.34	4,702.72	5,10
7. Additional depth, str. wall well	50 l. f.	6.00	10.00	10
8. Additional depth, gravel pack well	150 l. f.	12.90	17.50	15
9. Additional length, screen	160 l. f.	2.10	2.50	3
10. Rat hole	250 l. f.	2.35	4.00	6
11. Additional developing time	50 hr.	3.00	6.00	9
12. Additional 24-hr. flow test	1 ea.	108.00	144.00	150
13. Additional 10-hr. flow test	1 ea.	45.00	60.00	73

Contract 2—Water Well Pumps, etc.

LIST OF BIDDERS: (Opened June 7, 1944)

1. Layne Texas Co., Dallas, Tex. (contract)	$8,5
2. Dean Bell, San Angelo, Tex	9,3
3. Briggs Weaver Machinery Co., Dallas, Tex	9,5

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Pump, motor, starter, etc., Well No. 1	Lump Sum	$1,057.44	$1,200.00	$1,20
2. Pump, motor, starter, etc., Well No. 2	Lump Sum	1,057.44	1,150.00	1,15
3. Pump, motor, starter, etc., Well No. 4	Lump Sum	1,057.44	1,110.00	1,15
4. Pump, motor, starter, etc., Well No. 7	Lump Sum	1,025.94	1,154.00	1,20
5. Pump, motor, starter, etc., Well No. 9	Lump Sum	1,057.44	1,110.00	1,15
6. Pump, motor, starter, etc., Well No. 10	Lump Sum	1,057.44	1,150.00	1,15
7. Pump, motor, starter, etc., Well No. 11	Lump Sum	1,057.44	1,150.00	1,15
8. Pump, motor, starter, etc., Well No. 12	Lump Sum	1,057.44	1,200.00	1,20
9. 10-ft section of discharge column and pump shaft	4 ea.	31.50	33.00	50

(1) Layne pumps. (2) Pomona pumps. (3) Peerless pumps.

Contract 3—Supply Main and Collecting System

LIST OF BIDDERS: (Opened June 19, 1944)

1. Dalton & Cullum, Dallas, Tex. (contract)	$454,21
2. M. F. Fisher & Son., San Antonio, Tex	454,58
3. Brown & Root, Inc., Housotn, Tex	483,33
4. N. P. Van Vallenburgh, South Gate, Calif	486,07
5. Garey W. George Constr. Co., Mobile, Ala.	497,23
6. Oldt-Dellone, Dallas, Tex	498,83
7. Trueheart & Caldwell, San Antonio, Tex	515,70
8. Bailey Meissner, Wichita Falls, Tex	526,54
9. Lipport Bros., Oklahoma City, Okla.	538,89
10. Holland Page, Austin, Tex	555,41
11. C. H. Harrison, Waco, Tex	559,65
12. E. H. Reeder Constr. Co., Dallas, Tex	559,69
13. Thomas Bate & Son, Houston, Tex	561,13
14. Wahrmund & Logan, San Antonio, Tex	612,84

Item	Quan.	Unit Prices (1)	(2)	(3)
1. 16-in. c. i. pipe, Class 100	31,800 l. f.	$3.95	$3.84	[illegible]
2. 16-in. c. i. pipe, Class 150	11,200 l. f.	4.10	4.24	[illegible]
3. 14-in. c. i. pipe, Class 100	57,720 l. f.	3.30	3.28	[illegible]
4. 14-in. c. i. pipe, Class 150	12,000 l. f.	3.50	3.57	[illegible]
5. 14-in. c. i. pipe, Class 200	4,000 l. f.	3.75	3.74	[illegible]
6. 12-in. c. i. pipe, Class 100	2,520 l. f.	2.82	3.00	[illegible]
7. 10-in. c. i. pipe, Class 100	3,260 l. f.	2.28	2.53	[illegible]
8. 8-in. c. i. pipe, Class 100	5,000 l. f.	1.80	2.10	[illegible]
9. 6-in. c. i. pipe, Class 100	400 l. f.	1.36	1.73	[illegible]
10. Cast iron bell and spigot fittings	7 ton	160.00	190.00	[illegible]

(*Continued on page* 202)

ENTION CONTRACTORS and CONSTRUCTION MEN!

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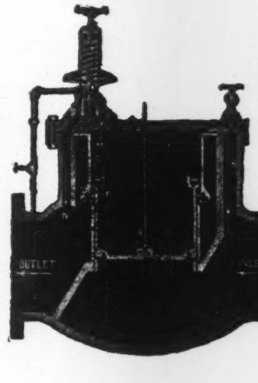
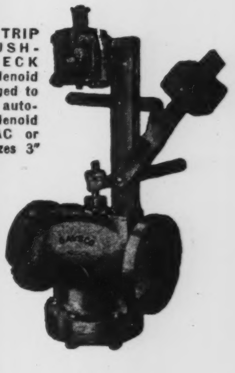
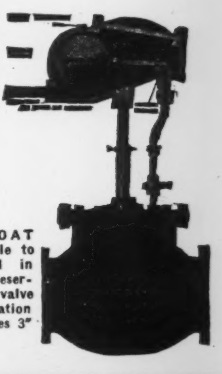
CONE THRU-FLOW VALVES — Assure full line opening without pressure drop on automatic service. Can be supplied for manual operation in lieu of gate valves. Sizes 4" to 72".

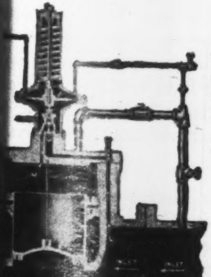


WATER PRESSURE REDUCING and CHECK VALVES—Insure continuous terminal-delivery service. No metal-to-metal contacts — no adjustment shock or jar. Sizes ½" to 36".



ELECTRIC TRIP DOUBLE CUSHIONED CHECK VALVES — Solenoid operated, arranged to open or close automatically. Solenoid supplied for AC or DC service. Sizes 3" to 24".





ALTITUDE CONTROL VALVES — For accurate water level control. Differential arrangement permits delayed opening for any depth tank. May be arranged for remote control. Sizes 2" to 36", single or double acting.

CONTROLLED FLOAT VALVES — Adaptable to water level control in heaters, basins, reservoirs, etc. Needle valve control permits regulation of closing speed. Sizes 3" to 36".

GOLDEN-ANDERSON VALVE SPECIALTY CO.

FULTON BLDG. • PITTSBURGH, PA.

WATER SUPPLY SYSTEM BIG SPRING, TEXAS (cont'd.)

11. Cast iron flanged fittings	1 ton	250.00	250.00	275.00
12. 16-in. gate valves (AWWA)	3 ea.	200.00	195.00	225.00
13. 14-in. gate valves (AWWA)	7 ea.	155.00	145.00	175.00
14. 6-in. gate valves (AWWA)	5 ea.	35.00	43.00	80.00
15. 14-in. gate valves (50# WP)	1 ea.	125.00	127.00	150.00
16. 12-in. gate valves (50# WP)	2 ea.	87.50	106.00	120.00
17. 10-in. gate valves (50# WP)	3 ea.	70.00	83.00	110.00
18. 8-in. gate valves (50# WP)	4 ea.	50.00	56.00	75.00
19. 6-in. gate valves (50# WP)	4 ea.	32.50	41.00	50.00
20. 6-in. check valves	8 ea.	37.50	42.00	55.00
21. 1-in. corporation cock drains	8 ea.	5.00	8.60	15.00
22. 2-in air valve assembly	20 ea.	55.00	49.00	60.00
23. 1-in. air valve assembly	2 ea.	37.50	34.00	50.00
24. Air valve manholes	22 ea.	120.00	94.00	200.00
25. Valve boxes for valves 10-in. and larger	20 ea.	8.00	11.00	20.00
26. Valve boxes for valves 8-in. and larger	15 ea.	4.00	7.00	15.00
27. Valve markers	57 ea.	4.00	3.30	4.00

WATER MAINS, DALLAS, TEX.

OWNER: City of Dallas, Tex.; John Winder, chief engr., City Waterworks Dept.

PROJECT: Construction of 30-in. and 16-in. cast iron water mains for extension to Dallas, Tex. water supply system. Includes furnishing and installing approximately 16,000 ft. of 30-in. cast iron pipe; 10,000 ft. of 16-in. pipe; 1,500 ft. of 12-in. pipe; 1,500-ft. of 8-in. pipe; 55 tons of cast iron special fittings; and necessary gate valves. Also involves concrete structures and replacing of pavement.

CONDITIONS: Contractor to furnish all materials and complete work in 90 calendar days. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.25 to $1.625 per hour; semi-skilled, 75c.; and common, 55c.

BIDS: Ten bids were received February 9, 1944, ranging from the contract low of $293,218 to $405,799. Awarded February 11, 1944.

LIST OF BIDDERS:

1. E. L. Dalton Co., Ltd., and W. G. Cullum, Dallas, Tex. (contract)	$293,218
2. Ben Sira & Co., Dallas, Tex	328,731
3. P. C. Sorenson Co., Dallas, Tex	329,426
4. Sherman Machine & Iron Works, Oklahoma City, Okla.	333,363
5. Claud Everett, Inc., Houston, Tex	337,004
6. Leland Fikes, Dallas, Tex	337,219
7. E. H. Reeder Constr. Co., Dallas, Tex	340,533
8. E. E. Farrow, Inc., Dallas, Tex	355,475
9. B. & M. Constr. Co., Oklahoma City, Okla	371,620
10. Peter Kiewit Sons Co., Omaha, Nebr	405,799

		Unit Prices		
Item	Quan	(1)	(2)	(3)
1. 30-in. c. i. water main (Cl. 1) b. & s.	15,127 l. f.	$12.30	$14.00	$14 36
2. 30-in. c. i. water main (Cl. 1) mech. joints	354 l. f.	13.30	16.00	15.55
3. 20-in. c. i. water main (Cl. 150) b. & s.	87 l. f.	8.10	8.75	8.11
4. 16-in. c. i. water main (Cl. 150) b. & s.	9,264 l. f.	5.40	6.00	5.63
5. 12-in. c. i. water main (Cl. 150) b. & s.	1,552 l. f.	2.85	4.00	3.68
6. 8-in. c. i. water main (Cl. 150) b. & s.	1,504 l. f.	2.15	3.00	2.30
7. 6-in. c. i. water main (Cl. 150) b. & s.	161 l. f.	1.50	2.50	1.90
8. Cast iron special fittings (400-ft. working pressure)	55 tons	190.00	200.00	210.00
9. 30-in. gate valve	1 ea.	2,100.00	1,750.00	2,070.00
10. 24-in. gate valves	4 ea.	1,350.00	1,000.00	1,410.00
11. 20-in. gate valve	1 ea.	950.00	800.00	987.00
12. 16-in. gate valves	5 ea.	210.00	200.00	195.00
13. 12-in. gate valves	5 ea.	120.00	120.00	123.00
14. 8-in. gate valves	5 ea.	60.00	60.00	62.00
15. 6-in. gate valves	29 ea.	37.50	40.00	45.00
16. 4-in. gate valves	1 ea.	30.00	30.00	32.00
17. Air relief valves	4 ea.	475.00	450.00	628.00
18. Fire hydrants	6 ea.	100.00	100.00	100.00
19. Class A concrete	28 c. y.	40.00	40.00	45.00
20. Class C concrete	25 c. y.	15.00	20.00	22.00
21. T. & P. railway crossing	Lump Sum	3,000.00	4,000.00	2,500.00
22. 24-in. cast iron main	12 l. f.	10.00	10.00	14.00
23. Gravel backfill	30 c. y.	2.50	3.00	5.00
24. Replace brick pavement	30 s. y.	6.00	5.00	7.50
25. Replace concrete paving	42 s. y.	6.00	4.00	7.00
26. Replace asphalt paving	807 s. y.	2.50	3.00	.50
27. Replace surf.-treated pavement	4,885 s. y.	2.50	2.50	2.50

SANITARY SEWERS BALTIMORE, MARYLAND

OWNER: City of Baltimore, Md., Dept. of Public
George E. Finck, sewerage engineer

PROJECT: Construction of sanitary sewers in Dund
timore City, Md., including furnishing and laying 2
of 27-in. vitrified pipe sewer encased in concrete; n
excavation for vitrified pipe and masonry curves in
excavation below subgrade and for test pits; concrete
and brick masonry; manholes; and 6-in. underdrai
excavation (unclassified) includes sheeting and inci
(Contract No. 346.)

CONDITIONS: Contractor to furnish all materials a
plete work in 200 calendar working days. Rail an
way transportation facilities available. Wage rates i
more are: skilled labor, $1.4375 to $2.00 per ho
common labor, 75c.

BIDS: Four bids were received August 11, 1944,
from the contract low of $144,320 to $173,506.

LIST OF BIDDERS:

1. Square Construction Co., Baltimore, Md. (contract)
2. John Matricciani & Sons, Baltimore, Md.
3. Leo Butler Co., Silver Spring, Md.
4. Marocco Construction Co., Baltimore, Md.

		Unit Pri	
Item	Quan.	(1)	(2
1. Uncl. excav. and refill for 27-in. conc. enclosed vitr. pipe sewer, and masonry curves in tunnel	2,098 l. f.	$45 00	$45.00
2. Unclassified excav. below subgrade	100 c. y.	5 00	6.00
3. Gravel refill below subgrade	100 c. y.	5 00	6.00
4. Unclassified excav. for test pits	50 c. y.	4 00	2.00
5. Furn. and place cinder toppng	100 c. y.	3 00	2.50
6. Class A concrete masonry	5 c. y	60 00	40.00
7. Class B concrete masonry	725 c. y.	30 00	28.00
8. Class C concrete masonry	50 c. y.	30 00	25.00
9. Ordinary brick masonry	1 c. y.	100 00	60.00
10. Vitrified brick masonry	2 c. y.	100 00	75.00
11. Type C manholes (No. 1, 2, 3, 4, 5)	185 l. f.	30 00	70.00
12. Type C manhole (No. 6)	35 l. f.	40 00	70.00
13. Uncl. excav., furn. and lay 6-in. underdrain	2,100 l. f.	.50	1.50
14. Furn. and lay 27-in. vitr. pipe sewer, not including conc. around pipe	2,070 l. f.	8.00	6.00

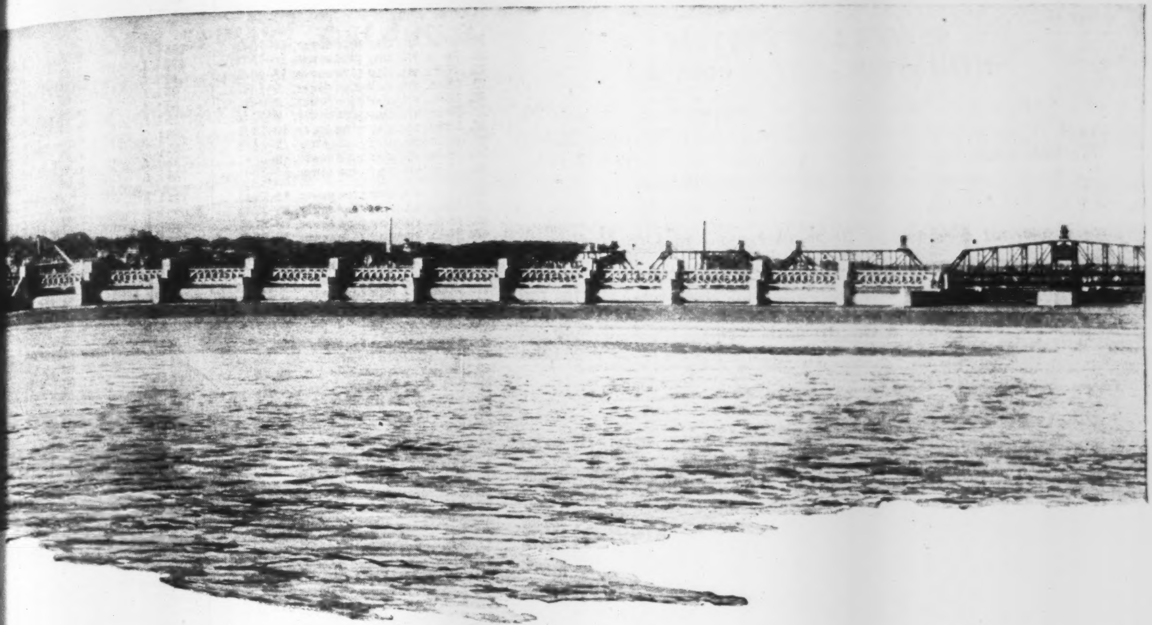
SEWERAGE SYSTEM HOUSTON, TEX.

OWNER: Federal Works Agency, Fort Worth, Te
City of Houston, Tex.

PROJECT: Construction of sewage disposal plant a
station (Contract 6), and sewage collection lines a
station (Contract 7) in Houston, Tex., serving approxi
10,884 people. Alternates were allowed in Contract 6
standard filter plant, or an alternate plant with items a
below in the tabulation. Award made on basis of alt
type filter plant. Contract 6 involves paving of driv
walks, curbs and gutters; drainage pipes and struc
fencing; yard piping and service lines; sewage lift
Imhoff tank; sludge drying beds and pumping plant;
and laboratory building; head box; trickling filter; cl
and Parshall flume. On Contract 7 alternates were al
for vitrified clay sewer pipe, or concrete sewer pipe. A
on vitrified pipe basis.

CONDITIONS: Contractor to furnish all materials o
contracts. Completion time on Contract 6 is 180 ca
days; on Contract 7 it is 175 calendar days. Rail, highwa
water transportation facilities available. Wage rate
skilled labor $1.725 per hour; semi-skilled $1.00; and
mon, 60c.

(Continued on page 204)



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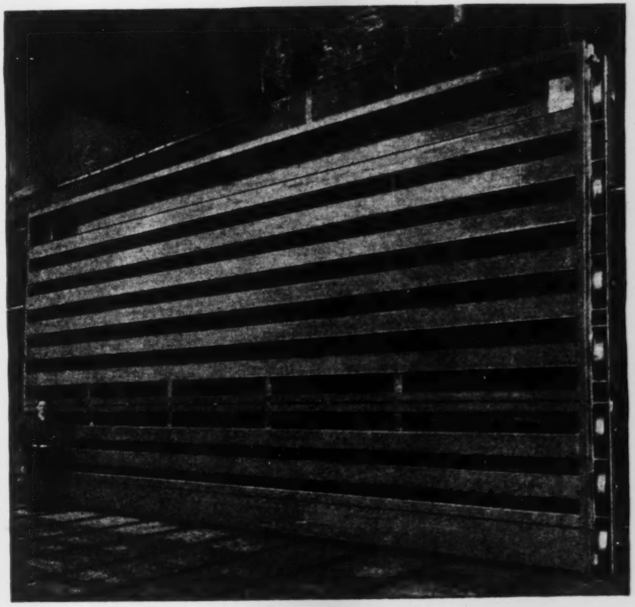

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SEWERAGE SYSTEM HOUSTON, TEX. (cont'd.)

BIDS: Four bids were received on Contract 6, September 20, 1944 ranging from the contract low of $193,190 to $203,400. Six bids were opened on the same date for Contract 7 ranging from the contract low of $292,076 to $421,530.

Contract 6—Sewage Disposal Plant and Lift Station

LIST OF BIDDERS: (Alternate trickling filter.)

1. Tellepsen Constr. Co., Houston, Tex. (contract)	$193,190
2. Gayle Brothers, Houston, Tex	196,698
3. R. P. Farnsworth & Co., Houston, Tex	199,423
4. John G. Holland, Houston, Tex	203,400

Item	Quan.	Unit Prices (1)	(2	(3)
1. Conc. and gravel driveways, walks, curbs and gutters	Lump Sum	$13,300.00	$7,377.50	$11,544.00
2. Drain pipes and drainage structures	Lump Sum	5,200.00	13,232.00	6,200.00
3. Fencing, gates and flood gates	Lump Sum	4,800.00	4,828.42	5,880.00
4. Yard piping, gas lines, cast iron pipe, etc	Lump Sum	21,560.00	7,335.00	15,952.00
5. All yard electric service lines	Lump Sum	1,390.00	1,243.00	1,495.00
6. Sewage lift line	Lump Sum	20,760.00	23,491.91	15,319.00
7. Install Imhoff tank, with pipes	Lump Sum	46,400.00	51,208.84	55,473.00
8. Sludge drying beds	Lump Sum	24,120.00	22,000.00	31,530.00
9. Sludge pumping plant	Lump Sum	3,850.00	4,596.41	3,639.00
10. Office and laboratory building	Lump Sum	10,000.00	18,665.00	13,360.00

(Above items are common to both standard and alternate filter systems)

Items for Standard Trickling Filter

Item	Quan.	Unit Prices (1)	(2)	(3)
11. Dosing plant and siphon	Lump Sum	$1,750.00	$1,029.68	$1,393.00
12. Two standard trickling filters	Lump Sum	67,300.00	62,424.30	53,223.00
13. Standard Parshall flume	Lump Sum	1,400.00	1,695.00	1,554.00
14. Standard filter recirculation tank	Lump Sum	4,700.00	4,700.00	5,059.66

Items for Alternate Trickling Filter

Item	Quan.	Unit Prices (1)	(2)	(3)
15. Head box, complete	Lump Sum	$800.00	$1,029.68	$439.00
16. Alternate trickling filter	Lump Sum	23,900.00	22,946.40	20,825.00
17. Clarifier (alternate)	Lump Sum	15,500.00	16,548.65	16,715.00
18. Parshall flume (the deeper struct.)	Lump Sum	2,300.00	2,195.00	,250.00

Contract 7—Sewage Collection Lines and Lift Station

LIST OF BIDDERS: (Vitrified Clay Pipe Sewer).

1. Carey W. George Constr. Co., Mobile, Ala. (contract)	$292,076
2. C. F. Lytle Co., Sioux City, Iowa	313,616
3. Koller Constr. Co., Oklahoma City, Okla	317,711
4. R. P. Farnsworth & Co., Houston, Tex	326,952
5. Tellepsen Constr. Co., Houston, Tex	384,666
6. Knutson Constr. Co., Houston, Tex	421,530

Item	Quan.	Unit Prices (1)	(2)	(3)
1. 6-in. vit. clay pipe sewer, 0–6-ft	9,830 l. f.	$0.82	$0.95	$1.00
2. 6-in. vit. clay pipe sewer, 6–8-ft	300 l. f.	1.06	.99	1.55
3. 6-in. vit. clay pipe sewer, 8–10-ft	10 l. f.	1.20	1.04	1.70
4. 8-in. vit. clay pipe sewer, 0–6-ft	19,805 l. f.	1.04	1.22	1.30
5. 8-in. vit. clay pipe sewer, 6–8-ft	20,335 l. f.	1.16	1.25	1.35
6. 8-in. vit. clay pipe sewer, 8–10-ft	7,255 l. f.	1.28	1.44	1.80
7. 8-in. vit. clay pipe sewer, 10–12-ft	6,185 l. f.	1.61	1.53	2.10
8. 8-in. vit. clay pipe sewer, 12–14-ft	875 l. f.	2.62	1.65	2.50
9. 8-in. vit. clay pipe sewer, 14–16-ft	850 l. f.	3.70	1.69	3.05
10. 8-in. vit. clay pipe sewer, 16–18-ft	1,025 l. f.	4.80	2.00	3.80
11. 8-in. vit. clay pipe sewer, 18–20-ft	10 l. f.	6.10	2.32	4.50
12. 10-in. vit. clay pipe sewer, 0–6-ft	860 l. f.	1.30	1.52	1.55
13. 10-in. vit. clay pipe sewer, 6–8-ft	800 l. f.	1.45	1.54	1.65
14. 10-in. vit. clay pipe sewer, 8–10-ft	1,450 l. f.	1.52	1.65	2.10
15. 10-in. vit. clay pipe sewer, 10–12-ft	910 l. f.	2.10	1.75	2.35
16. 10-in. vit. clay pipe sewer, 12–14-ft	2,200 l. f.	2.24	1.85	2.70
17. 10-in. vit. clay pipe sewer, 14–16-ft	10 l. f.	3.20	1.99	3.40
18. 10-in. vit. clay pipe sewer, 16–18-ft	2,250 l. f.	3.92	2.20	4.15
19. 10-in. vit. clay pipe sewer, 18–20-ft	375 l. f.	5.15	2.58	4.70
20. 10-in. vit. clay pipe sewer, 20–22-ft	125 l. f.	7.60	2.92	5.50
21. 10-in. vit. clay pipe sewer, 22–24-ft	10 l. f.	10.65	3.31	6.75
22. 12-in. vit. clay pipe sewer, 8–10-ft	2,280 l. f.	1.84	2.00	2.40
23. 12-in. vit. clay pipe sewer, 10–12-ft	250 l. f.	2.65	2.10	2.70
24. 12-in. vit. clay pipe sewer, 12–14-ft	1,300 l. f.	2.78	2.22	3.00
25. 12-in. vit. clay pipe sewer, 14–16-ft	1,300 l. f.	3.48	2.34	3.65
26. 12-in. vit. clay pipe sewer, 16–18-ft	10 l. f.	6.66	2.47	4.35
27. 12-in. vit. clay pipe sewer, 18–20-ft	10 l. f.	8.64	2.88	5.00
28. 15-in. vit. clay pipe sewer, 10–12-ft	4,895 l. f.	3.05	2.60	3.65
29. 15-in. vit. clay pipe sewer, 12–14-ft	2,225 l. f.	3.36	2.73	4.30
30. 15-in. vit. clay pipe sewer, 14–16-ft	925 l. f.	3.95	[illegible]	
31. 15-in. vit. clay pipe sewer, 16–18-ft	425 l. f.	6.37	[illegible]	
32. 15-in. vit. clay pipe sewer, 18–20-ft	10 l. f.	22.23	[illegible]	
33. 18-in. vit. clay pipe sewer, 0–6-ft	35 l. f.	2.95	[illegible]	
34. 18-in. vit. clay pipe sewer, 6–8-ft	35 l. f.	3.14	[illegible]	
35. 18-in. vit. clay pipe sewer, 8–10-ft	2,735 l. f.	3.24	[illegible]	
36. 18-in. vit. clay pipe sewer, 10–12-ft	1,285 l. f.	3.86	[illegible]	
37. 18-in. vit. clay pipe sewer, 12–14-ft	735 l. f.	4.20	[illegible]	
38. 18-in. vit. clay pipe sewer, 14–16-ft	735 l. f.	4.68	[illegible]	
39. 18-in. vit. clay pipe sewer, 16–18-ft	735 l. f.	5.06	3.58	
40. 18-in. vit. clay pipe sewer, 18–20-ft	135 l. f.	6.68	3.80	
41. 18-in. vit. clay pipe sewer, 20–22-ft	3,020 l. f.	7.82	4.10	
42. 18-in. vit. clay pipe sewer, 22–24-ft	10 l. f.	12.31	4.62	
43. 24-in. vit. clay pipe sewer, 20–22-ft	200 l. f.	16.00	5.45	
44. 24-in. vit. clay pipe sewer, 22–24-ft	10 l. f.	21.86	[illegible]	
45. 8-in. c. i. pipe for sewer	472 l. f.	2.60	[illegible]	
46. 10-in. c. i. pipe for sewer	180 l. f.	5.12	[illegible]	
47. 12-in. c. i. pipe for sewer	18 l. f.	3.79	[illegible]	
48. 16-in. c. i. pipe for sewer	200 l. f.	4.40	4.10	
49. 18-in. c. i. pipe for sewer	200 l. f.	5.16	[illegible]	
50. 24-in. c. i. pipe for sewer	12 l. f.	10.76	7.95	
51. 6-ft. standard manhole	251 ea.	75.00	122.20	
52. Extra depth manhole	554 ft.	11.00	23.30	
53. 6-ft. drop manholes	20 ea.	25.00	128.00	
54. Extra depth manhole	165 ft.	5.00	23.30	
55. Stacks, 0 to 7-ft	231 ea.	9.00	6.60	
56. Extra height stacks	701 ft.	1.20	1.32	
57. 6x6-in. wyes and tees	379 ea.	2.00	1.65	
58. 6x8-in. wyes and tees	1,185 ea.	3.00	3.00	
59. Cleanouts, furnished	18 ea.	30.00	30.00	
60. 8-in. sewer under railroad tracks	Lump Sum	960.00	630.00	
61. 8-in. sewer under interurban tracks	Lump Sum	840.00	530.00	
62. 8-in. sewer under railroad tracks	Lump Sum	800.00	530.00	
63. 8-in. sewer under interurban tracks	Lump Sum	750.00	530.00	
64. 8-in. sewer under interurban tracks	Lump Sum	900.00	570.00	
65. 24-in. sewer under inter. tracks at disposal plant	Lump Sum	1,200.00	990.00	
66. 8-in. sewer under street	Lump Sum	1,500.00	925.00	
67. 8-in. sewer under street	Lump Sum	1,200.00	925.00	
68. 8-in. sewer under street	Lump Sum	1,000.00	740.00	
69. 8-in. sewer under street	Lump Sum	1,800.00	740.00	
70. 12-in. sewer under federal road	Lump Sum	1,600.00	570.00	
71. 12-in. sewer under street	Lump Sum	1,500.00	530.00	
72. 18-in. sewer under street	Lump Sum	2,000.00	925.00	
73. Headwall and spillway apron	Lump Sum	600.00	200.00	
74. Extra earth excavation	100 c. y.	12.00	2.65	
75. Concrete, 2,000-lb., in place	25 c. y.	50.00	26.50	
76. Concrete, 3,000-lb., in place	20 c. y.	65.00	190.00	
77. Rein. conc., 3,000-lb., in place	2 c. y.	80.00	200.00	
78. Concrete reinforcing bars	2,000 lb.	.15	.065	
79. Timber and lumber	606 M bm.	40.00	95.00	
80. Hauling supplies	100 ton-mile	1.00	1.32	
81. Sewage lift plant	Lump Sum	8,852.00	12,000.00	

SEWER RELEASE MAIN CALIFORNIA

OWNER: Stege Sanitary District, El Cerrito, Calif.; E Hussey, district engineer.

PROJECT: Construction of sewer release main in Fair and Central Avenues to Richmond Annex, Calif. Includes struction of field office; furnishing and installing vitrified and reinforced concrete pipe; concrete jackets and cradles; and concrete covers and rims for manholes.

CONDITIONS: Contractor to furnish all materials and plete work in 120 days. Highway transportation faci available to site of work. Wage rates are: skilled labor, to $2.00 per hour; semi-skilled, $1.00 to $1.40; and com $1.00.

BIDS: Six bids were received in March, 1944, ranging the contract low of $102,397 to $147,883.

LIST OF BIDDERS:

1. Stolte, Inc., Oakland, Calif. (contract)	$102
2. John Pestana, Oakland, Calif.	112
3. M. J. McGuire and M. Hester, Oakland, Calif	119
4. R. Goold & Son, Stockton, Calif	122
5. Oakland Sewer Constr. Co., Oakland, Calif	127
6. M. J. Lynch, San Francisco, Calif	147

Item	Quan.	Unit Prices (1)	(2)
1. Field office	Lump Sum	$350.00	$350.00
2. 15-in. vitrified clay pipe	360 l. f.	8.10	8.75
3. 24-in. vitrified clay pipe	2,486 l. f.	16.00	12.25
4. 24-in. conc. pipe (rein. with double circular cages, 10.25 lbs. of steel per ft., 3000-D)	142 l. f.	30.00	32.00
5. 36-in. vitrified clay sewer pipe	2,373 l. f.	17.15	23.25
6. 36-in. conc. pipe (rein. with double circular cages, 24.6 lbs. of steel per ft., 3000-D)	70 l. f.	48.50	45.00
7. Class B conc. jacket on 24 and 36-in. pipe	433.4 l. f.	11.20	23.00
8. Reinforced conc. cover and unreinforced rim for manholes	25 ea.	220.00	200.00
9. Class B conc. cradles under sewer pipe	50 c. y.	13.00	23.00

STORM SEWERS, OKLAHOMA

OWNER: City of Tulsa, Okla.; Dan W. Patton, city engineer.

PROJECT: Construction of reinforced, semi-elliptical, monolithic concrete storm sewer in White City Addition, east of Yale Drive, Tulsa, Okla. (No. 10-42). Sewer serves White City, Yale Heights and Franklin Second Additions.

CONDITIONS: Contractor to furnish all materials and complete work in 120 working days. Highway transportation facilities available to site of project. Wage rates are: skilled labor, $1.50 per hour; semi-skilled, $1.00; and common, 80c.

BIDS: Six bids were received July 7, 1944, ranging from the contract low of $51,322 to $54,655. Engineers estimate, $56,905.

LIST OF BIDDERS:

1. F. M. Stowell, Tulsa, Okla. (contract)	$51,322
2. H. J. Happel, Tulsa, Okla.	53,188
3. Eckles Constr. Co., Tulsa, Okla.	53,908
4. Foster Construction Co., Tulsa, Okla.	54,156
5. Henryetta Constr. Co., Henryetta, Okla.	54,587
6. S. R. Smith & Jack E. Stegall, Tulsa, Okla.	54,655

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Earth excav. and backfill	2,993 c. y.	$1.00	$2.00	$1.50
2. Rock excav. and backfill	2,991 c. y.	3.25	2.00	2.50
3. 66-in. rein. semi-ellip. monolithic conc. sewer (excl. steel) Type I	460 l. f.	8.70	9.30	9.30
4. As above, Type II	255 l. f.	8.70	8.50	8.70
5. 60-in. rein. semi-ellip. monolithic conc. sewer (excl. steel)	489 l. f.	8.50	8.20	8.60
6. 54-in. rein. semi-ellip. monolithic conc. sewer (excl. steel) Type I	689 l. f.	6.34	7.30	7.10
7. As above, Type II	142 l. f.	6.34	6.80	7.00
8. 48-in. rein. semi-ellip. monolithic conc. sewer (excl. steel)	547 l. f.	5.50	6.10	6.30
9. As above, 42-in	1,361.7 l. f.	4.75	5.30	5.35
10. 4x2-ft. rein. mono. conc. box section sewer (excl. steel)	750.9 l. f.	5.20	6.30	6.50
11. 6-ft. rein. mono. connector 66-in. to 60-in. (excl. steel)	1 ea.	67.00	60.00	67.00
12. As above, 60-in. to 54-in	1 ea.	63.00	60.00	63.00
13. As above, 54-in. to 48-in	1 ea.	45.00	50.00	45.00
14. As above, 48-in. to 42-in	1 ea.	38.00	35.00	38.00
15. 6-ft. rein. mono. conc. connection, 42-in. to 4-ft. 8-in. box (excl steel)	1 ea.	63.00	65.00	63.00
16. 8-in. sewer pipe san. sew. revision	1,650 l. f.	.75	.70	.85
17. Conc. cradle for 8-in. san. sewer	1,650 l. f.	.65	.70	.65
18. 15-in. precast conc. sewer pipe (stub-outs)	200 l. f.	1.35	1.35	1.35
19. As above, 18-in	200 l. f.	1.60	1.65	1.60
20. Standard manholes (to 6-ft. depth)	19 ea.	75.00	75.00	75.00
21. Additional feet of manhole	35 ft.	7.00	9.00	7.00
22. Reinforcing steel for sewers	75,000 lb.	.06	.0575	.06
23. Remove, replace conc. pavement	50 s. y.	3.90	4.25	3.90
24. Remove 2x2¼-ft. conc. box	1 ea.	40.00	40.00	35.00

SANITARY SEWER SYSTEM MAGNA, UTAH

OWNER: Town of Magna, Salt Lake County, Utah. C. J. Ullrich, Salt Lake City, engineer.

PROJECT: Completion of sanitary sewerage system in Magna, Utah, involving the furnishing and laying of approximately 49,000 linear feet of vitrified clay sewer pipe; necessary trench excavation and backfill, including one line in alley that is 9 to 12-ft. wide in which pipe is laid 12 to 16-ft. deep in hand-excavated trench.

CONDITIONS: Contractor to furnish all materials and complete work in 175 working days. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.25 to $1.50 per hour; semi-skilled, $1.00 to $1.10; and common, 75c. Project originally started in 1941 as WPA project. Disposal unit is completed and half of sewer system already in.

PARTIAL LIST OF BIDDERS:

1. Enoch Smith Sons Co., Salt Lake City, Utah (contract)	$122,288
2. Stroud-Seabrook, Layton, Utah	134,216
3. Wheeler & Tempest, Salt Lake City, Utah	157,777

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Field office	Lump sum	$500.00	$300.00	$450.00
2. Sewer trench excav. and bkfill	28,100 c. y.	1.40	1.20	1.10
3. Spec. sewer trench excav. and bkfill	2,400 c. y.	3.00	5.00	3.75
4. Service lateral excav. and bkfill	7,500 c. y.	2.00	2.50	1.50
5. 15-in. vitrified clay sewer pipe	300 l. f.	2.00	1.75	3.38
6. 12-in. vitrified clay sewer pipe	1,100 l. f.	1.40	1.30	3.60
7. 10-in. vitrified clay sewer pipe	3,550 l. f.	1.10	1.10	1.97
8. 8-in. vitrified clay sewer pipe	26,005 l. f.	.90	.80	1.24
9. 4-in. vitrified clay sewer pipe	17,000 l. f.	.50	.50	2.13
10. 15x4-in. vitrified clay wyes	7 ea.	10.00	9.00	8.65
11. 12x4-in. vitrified clay wyes	25 ea.	6.00	8.00	12.50
12. 10x4-in. vitrified clay wyes	159 ea.	5.00	7.00	7.35
13. 8x4-in. vitrified clay wyes	930 ea.	3.00	6.00	4.75
14. 8x6-in. vitrified clay wyes	5 ea.	3.00	6.00	4.75
15. 4-in. 45-deg. vitr. clay ells	1,111 ea.	1.50	1.20	3.03
16. Gravel fill for trench bottom	500 c. y.	2.00	1.50	1.65
17. 2x8-in. plank for pipe support	5,000 ft. b.m.	.10	.05	.09
18. Conc. manhole, c.i. cover and ring	84 ea.	150.00	250.00	145.00
19. Conc. flush tank, c.i. cover and ring	9 ea.	200.00	300.00	227.00
20. Conc. manhole per ft. over 10′ deep	30 l. f.	15.00	15.00	11.70
21. 8-in. cast iron pipe, under RR track	96 l. f.	3.00	6.00	3.70
22. 10-in. cast iron pipe, under RR track	32 l. f.	5.00	7.00	4.80

CROOKED RIVER CROSSING DESCHUTES PROJECT, OREGON

OWNER: U. S. Bureau of Reclamation, Bend, Ore.

PROJECT: Constructing Crooked River crossing, a reinforced-concrete structure approximately 672-ft. long on the North Unit Main Canal, Deschutes Project, Oregon. Consists of inlet structure with wasteway, a concrete flume 10-ft. wide by 9½-ft. deep and 521-ft. long, and an outlet transition structure. Flume to be supported on pedestals and bents at the abutments, and central portion of flume to be supported by an arch-type structure 266 ft. between abutments. Concrete slab to be placed on top of flume to form roadway 13-ft. wide. Wasteway to consist of radial-gate structure to control the waste flow, and an unlined channel about 150-ft. long extending to river channel.

CONDITIONS: Government to furnish cement; sand and coarse aggregates; reinforcing bars; posts and timber for railings, but not lumber for forms or other temporary construction; rubber water stops; elastic joint-filler material and coating material; metalwork for fixed and expansion bearings; pipe and fittings for drains; radial gate and hoist; pipe and fittings for railings; stop-plank guides; anchor bolts; and all other materials which will become part of completed structure. Completion time: 240 calendar days. Nearest shipping point by railroad is Terrebone, Ore. Wage rates: skilled labor, $1.35 to $2.00 per hour; semi-skilled, $1.00 to $1.50; and common labor, 95c.

BIDS: Six bids were received June 3, 1944, ranging from the low of $162,406 to $285,475.

LIST OF BIDDERS:

1. David A. Richardson, Santa Cruz, Calif	$162,406
2. Scheumann & Johnson, Seattle, Wash	163,950
3. Clifford A. Dunn, Klamath Falls, Ore	170,658
4. McLaughlin Constr. Co., Pocatello, Idaho	179,977
5. C. J. Montag & Sons, Portland, Ore	185,510
6. Otis Williams & Co., Helena, Mont	285,475

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common	1,600 c. y.	$10.00	$6.00	$2.50
2. Excavation, rock	2,800 c. y.	13.00	6.00	7.00
3. Backfill	2,600 c. y.	.60	1.50	.75
4. Compacting backfill	1,000 c. y.	1.00	1.50	1.25
5. Concrete in abutments and pedestals	600 c. y.	30.00	30.00	20.00
6. Concrete in inlet, check, wasteway, inlet and outlet flumes, and outlet transition	330 c. y.	40.00	40.00	29.00
7. Conc. in bents and spans 1 to 5, inclusive	1,520 c. y.	40.00	55.00	65.00
8. Place reinforcing bars in inlet, check, wasteway, inlet and outlet flumes, and outlet transition	41,000 lb.	.03	.03	.06
9. Place reinf. bars in bents, abutments, pedestals and spans 1 to 5, incl.	372,000 lb.	.0275	.03	.04
10. Welding 1¼-in. square reinf. bars	16 welds	5.00	10.00	5.00
11. Place elastic filler mat'l. in joints	200 s. f.	1.00	1.00	.80
12. Place rubber water stops in joints	180 l. f.	.70	1.00	1.50
13. Constructing timber railings	8 Mbm.	40.00	100.00	50.00
14. Install radial gate and radial-gate hoist	7,200 lb.	.06	.10	.14
15. Install miscellaneous metalwork	29,000 lb.	.10	.10	.16

EARTHWORK AND STRUCTURES MADERA CANAL, CALIFORNIA

OWNER: Bureau of Reclamation, Central Valley Project, Friant Division, Friant, Calif.

PROJECT: Earthwork and structures from Sta. 1050+75 to Sta. 1926+90 on the Madera Canal, Friant Division, Central Valley Project, California. Includes all excavation for canals; construction of canal embankments; construction of dikes for Madera Reservoir; and the construction of drainage culverts, drain inlets, bridges, checks, turnouts, siphons, drops and chutes located at various points along the canal.

CONDITIONS: Government to furnish cement, reinforcing bars, metal pipe, timber in structures, asphalt plank on bridge floors, elastic joint-filler material, metal water stops, blow-off valves and connections, gates and gate hoists, and miscellaneous metalwork. Contractor to furnish all sand and coarse aggregate for concrete. Time for completion is 400 calendar days. Rail and highway transportation facilities available. Wage rates prevailing are: carpenters, $1.25 per hour; cement finishers and tractor operators, $1.50; batching- and mixing-plant operators, $1.25; drag-line operators, $1.60 to $1.75; and unskilled laborers, 85c.

BIDS: Eighteen bids were received Dec. 22, 1943 on Schedule I, ranging from the low of $165,365 to $280,937; and on Schedule II, on the same date, ranging from the low of $456,307 to $673,817. On the combination of the two schedules, eighteen bids received ranged from $630,066 to $916,388.

Schedule No. 1

PARTIAL LIST OF BIDDERS:

	Bidder	Amount
1.	Mittry Bros. Constr. Co., Los Angeles, Calif. (low bidder)	$165,365
2.	H. Earl Parker, Marysville, Calif	172,075
3.	A. Teichert & Co., Sacramento, Calif	173,759
4.	Winston Bros. Co., Los Angeles, Calif	180,405
5.	J. E. Haddock, Ltd., Pasadena, Calif	182,202
6.	Clyde W. Wood, Inc., Los Angeles, Calif	187,596
7.	Frederickson & Watson Constr. Co., and Frederickson Bros., Oakland, Calif.	192,411
8.	Guy F. Atkinson Co., San Francisco, Calif	203,750
9.	Larsen Bros. and Harms Bros., Sacramento, Calif	209,427
10.	David A. Richardson, Santa Cruz, Calif	218,512

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common, for canal	119,000 c. y.	$0.28	$0.25	$0.16
2. Excavation, rock, for canal	1,000 c. y.	1.00	.50	.70
3. Excavation, for core banks	500 c. y.	.28	.25	.13
4. Excava., common, for stripping dike foundn. and borrow pits	35,000 c. y.	.28	.20	.16
5. Excavation, for cut-off trench	14,000 c. y.	.28	.22	.14
6. Construct dike embankments	87,500 c. y.	.28	.28	.40
7. Paving on dikes	13,000 s. y.	2.50	3.50	3.50
8. Gravel surface on dike crests	1,530 c. y.	2.75	3.00	4.75
9. Excavation, common, for struct	13,500 c. y.	.75	.60	.52
10. Excavation, rock, for structures	200 c. y.	1.25	.60	2.00
11. Backfill	13,860 c. y.	.25	.25	.40
12. Puddling or tamping backfill	1,400 c. y.	1.00	.75	1.00
13. Concrete in structures	980 c. y.	32.00	32.00	35.10
14. Placing reinforcement bars	132,000 lb.	.03	0.425	.04
15. Dry-rock paving	700 s. y.	3.00	4.00	3.90
16. Erecting timber in structures	66 Mbm.	40.00	60.00	44.30
17. Install elastic joint-filler mat'l	40 s. f.	1.00	1.00	.15
18. Install rubber water stops	25 l. f.	1.50	1.00	1.00
19. Install gates and gate hoists	26,000 lb.	.10	.10	.10
20. Install miscellaneous metalwork	2,000 lb.	.25	.20	.15

Schedule No. 2

PARTIAL LIST OF BIDDERS:

	Bidder	Amount
1.	A. Teichert & Co., Sacramento, Calif. (low bidder)	$456,307
2.	H. Earl Parker, Marysville, Calif	477,260
3.	Winston Bros. Co., Los Angeles, Calif	478,110
4.	Mittry Bros. Constr. Co., Los Angeles, Calif	497,475
5.	Guy F. Atkinson Co., San Francisco, Calif	511,277
6.	J. E. Haddock, Ltd., Pasadena, Calif	513,349
7.	David A. Richardson, Santa Cruz, Calif	514,440
8.	Larsen Bros. and Harms Bros., Sacramento, Calif	534,390
9.	Clyde W. Wood, Inc., Los Angeles, Calif	551,132
10.	Rhoades Bros. and Shofner, Los Angeles, Calif	554,710

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common, for canal	628,000 c. y.	$0.16	$0.25	$0.22
2. Excavation, rock, for canal	6,000 c. y.	.70	.25	.75
3. Excavation, for core banks	72,000 c. y.	.10	.285	.25
4. Overhaul	318,000 sta. c. y.	.01	.01	.015
5. Compacting embankments	62,000 c. y.	.09	.10	.15
6. Excav., common, for drainage channels and dikes	62,000 c. y.	.86	.25	.35
7. Excav., rock, for drainage channels and dikes	500 c. y.	2.00	.50	1.00
8. Excavation, common, for structures	60,000 c. y.	.52	.50	.50
9. Excavation, rock, for structures	500 c. y.	2.00	1.00	1.50
10. Backfill	40,000 c. y.	.40	.25	.25
11. Puddling or tamping backfill	4,000 c. y.	1.00	.75	1.00
12. Concrete in structures	4,900 c. y.	35.10	32.00	38.00
13. Placing reinforcement bars	700,000 lb.	.04	.0425	.03
14. Dry-rock paving	4,000 s. y.	3.90	5.00	4.50
15. Erecting timber in structures	185 Mbm.	44.30	[illegible]	50.00
16. Place asphalt plank on bridge floors	7,700 s. f.	.20	1.00	.25
17. Install elastic joint-filler mat'l	40 s. f.	.15	1.00	1.00
18. Place metal water stops in joints	12,000 lb.	.10	.10	.10
19. Install blow-off valves and connections	2,400 lb.	.15	20	.15
20. Install gates and gate hoists	14,000 lb.	.10	.10	.10
21. Install miscellaneous metalwork	5,700 lb.	.15	.20	.15

EARTHWORK AND STRUCTURES ALTUS PROJECT, OKLA.

OWNER: Bureau of Reclamation, Altus, Oklahoma.

PROJECT: Construction of the West Canal turnout at Station 224+25.3, Altus Main canal; the check at Station 244+48.95, Altus Main canal; and earthwork and structures between Station 0+75.5 and Station 589+25, West canal, Altus Project, Oklahoma. Work is located north and west of Blair, Okla.

CONDITIONS: Contractor to furnish all coarse aggregate for concrete; all form materials; all wire, wire ties; metal or other temporary supports; all water used for mixing, cleaning and curing concrete, mortar and grout, for compacting backfill, and for moistening embankment materials to be compacted; sealing compound; all backfill materials; all rock and rock spalls; spikes or nails less than twenty-penny in size; and all other materials not part of completed construction work required for completion of the contract. Government to furnish all other materials. Time for completion is 160 calendar days. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.125 to $1.50; semi-skilled, 62½c. to $1.125; and common 57½c.

LIST OF BIDDERS: (Bids opened November 20, 1944)

	Bidder	Amount
1.	H. M. Thompson & Co., Ellinwood, Kan. (low bidder)	$153,107
2.	Spencer Constr. Co., Carrollton, Tex.	170,838
3.	Morrison-Knudsen Co., Inc., Boise, Idaho	173,997
4.	Austin Bridge Co., Dallas, Tex.	215,280
5.	Morse Bros. & Assoc., Inc., Shreveport, La.	216,953
6.	E. O. Korsmo Constr. Co., Memphis, Tenn.	229,760
7.	J. A. Terteling & Sons, Inc., Boise, Idaho	231,876
8.	Leo Sanders, Oklahoma City, Okla.	259,672
9.	A. G. Sherwood Constr. Co., Independence, Kan.	278,460
10.	Bozeman & Gray, Morgan City, La.	286,281
11.	Green & Groesbeck, Des Moines, Iowa	350,233

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation for canal	193,000 c. y.	$0.20	$0.24	$0.145
2. Overhaul	99,000 sta. c. y.	.025	.015	.02
3. Compacting embankments	72,000 c. y.	.06	.12	.20
4. Excavation for drainage channels and dikes	46,000 c. y.	.30	.30	.20
5. Excavation for structures	20,100 c. y.	.80	.79	1.00
6. Backfill	14,000 c. y.	.35	.26	.25
7. Compacting backfill	7,300 c. y.	.80	.60	1.00
8. Concrete in structures	1,780 c. y.	25.00	28.00	35.00
9. Placing reinforcing bars	183,000 lb.	.045	.035	.05
10. Dry-rock paving	1,460 s. y.	2.50	7.00	3.00
11. Erecting timber in structures	77 M bm.	75.00	100.00	50.00
12. Lay 18-in. concrete pipe	180 l. f.	1.80	1.50	4.00
13. Lay 24-in. concrete pipe	20 l. f.	2.50	2.00	6.00
14. Lay 30-in. concrete pipe	64 l. f.	3.00	2.50	7.00
15. Lay 48-in. concrete pipe	148 l. f.	4.50	3.00	8.00
16. Place metal water stops in joints	1,100 lb.	.50	.40	.30
17. Installing gates	15,500 lb.	.10	.05	.30
18. Install miscellaneous metal work	8,000 lb.	.20	.05	.30

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It's a fact! Every General Excavator built during the past 18 years, on which we are able to check, is still in action: doing a good day's work every day. Our records cover 98% of all Generals manufactured; the other machines are those sold by their original owners and on which we do not have recent information.

That's the kind of a performance record that has built confidence in General Excavators and Supercranes . . . confidence that will mean even more Generals at work during the postwar era. Include General in *your* postwar equipment plans! Get all the facts about the complete General line and be sure to inquire about the revolutionary new . . .

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Combination Crane, Shovel, Dragline and Backhoe—One Man Controlled—One Engine Operated—On Rubber Tires

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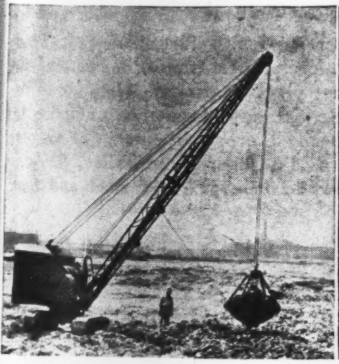

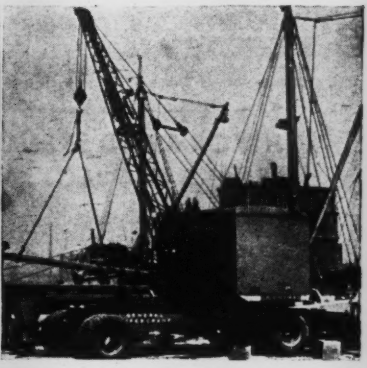

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PROVO RESERVOIR CANAL, SIPHONS, FLUMES, ETC., UTAH

OWNER: Bureau of Reclamation, Provo River Project, Provo, Utah.

PROJECT: Construction of Olmsted siphon, American Fork Creek siphon, and Dry Creek siphon, each consisting of a monolithic pipe structure with inside diameter of 8 feet; and construction of Highland Draw flume consisting of concrete structure 14-ft. wide, 6-ft. high, and 500-ft. long. Olmsted siphon approximately 4,250-ft. long; American Fork Creek siphon, 1,350-ft.; and Dry Creek siphon, 1,250-ft. Work also includes construction of all appurtenant and incidental structures and attachments.

CONDITIONS: Owner will furnish cement, reinforcing bars, precast concrete pipe, metal pipe, valves and fittings, radial gates and hoists, and miscellaneous metalwork. Contractor to furnish all sand and coarse aggregate for concrete. Time for completion, 300 calendar days. Wage rates are: skilled labor, $1.25 to $1.75 per hour; common labor, 75c.

BIDS: Five bids were received March 15, 1944, ranging from the low of $359,311 to $447,765.

LIST OF BIDDERS:

1. J. B. & R. E. Walker, Inc., Salt Lake City, Utah (low bidder)	$359,311
2. Stroud-Seabrook, Layton, Utah	382,519
3. David A. Richardson, Santa Cruz, Calif	384,825
4. Morrison-Knudsen Co., Boise, Idaho	440,876
5. Vinnell-Engineers Limited, Alhambra, Calif.	447,765

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common, structures	82,000 c. y.	$0.61	$0.55	$1.10
2. Excavation, rock, structures	3,000 c. y.	6.50	5.00	1.10
3. Excavation, common, for river-channel change and for wasteway channel	10,500 c. y.	.50	[illegible]	1.00
4. Excavation, rock, for river-channel change and for wasteway channel	50 c. y.	10.00	5.00	1.00
5. Overhaul	3,500 sta. y.	.03	.05	.10
6. Compacted embankment	6,000 c. y.	.45	2.00	1.00
7. Backfill	63,000 c. y.	.39	.35	.30
8. Compacting backfill	6,500 c. y.	1.00	5.00	.50
9. Dry-rock paving	30 s. y.	2.50	5.00	2.00
10. Riprap	40 c. y.	7.00	7.00	3.00
11. Rock backfill	3,000 c. y.	2.00	4.00	2.50
12. Constructing reverse filter	10 c. y.	3.00	10.00	4.00
13. Concrete in structures	7,600 c. y.	25.17	22.00	27.00
14. Place reinforcement bars	1,900,000 lb.	.0234	.03	.02
15. Welding 1¼-in. sq. reinforcing bars	27 welds	3.00	5.00	5.00
16. Place rubber water stops in joints	540 l. f.	2.00	1.50	.50
17. Place metal water stops in joints	40,000 lb.	.0933	.08	.08
18. Place elastic joint filler in joints	410 s. f.	1.00	.90	.50
19. Lay 24-in. concrete pipe	50 l. f.	1.50	2.00	2.00
20. Install radial gates and gate hoists	7,000 lb.	.10	.20	.07
21. Install miscellaneous metalwork	36,000 lb.	.05	.20	.08
22. Paint inside surfaces of conc. pipe	2,500 s. f.	.06	.10	.15

EARTHWORK AND STRUCTURES, MIRAGE FLATS PROJECT, NEBRASKA

OWNER: Bureau of Reclamation, Hemingford, Nebr.

PROJECT: Construction of required earthwork and structures from Station 0+00 to Station 692+56, Main Canal, Mirage Flats Project, Nebraska. Work is located from 12 to 22 miles northeast of Hemingford, Nebr. Earthwork includes clearing and grubbing; excavation for canal and core banks, for drainage channels and dikes, and for structures; compacting embankments; and backfill. Structures include siphons, culverts, siphon spillways, wasteways, bridges, turnouts, checks, road crossings, and transitions.

CONDITIONS: Government to furnish cement, reinforcing bars, lumber for permanent installation; concrete pipe; pipe and fittings for weep and air vent pipes; metal plates and plastic compounds for water stops; blow-off valves, gaskets, pipe and connections for siphons; pipe, fittings and rivets for pipe handrail; adjustable air vent assemblies; screw-lift vertical gates, radial gates, and gate hoists; [illegible] al work for stop-log grooves, weirs and weir drains, or [illegible] openings; weir gages; anchor bolts; bolts, washers, [illegible] screws and spikes; paint and coating materials; and all [illegible]r materials that will become permanent part of complet[illegible]onstruction work. Except that contractor will furnish sa[illegible] and coarse aggregate; wire, wire ties; nails under 20-[illegible]ny; water; backfill materials; rock and rock spalls; sea[illegible] compound welding rods. Work to be completed in 300 [illegible]endar days. Rail and highway transportation facilities avail[illegible]le near site of work. Wage rates are: skilled labor, $1.00 [illegible] $1.50 per hour; semi-skilled, 75c. to $1.00; and common [illegible]0c.

BIDS: Four bids were received January 3, 1945, [illegible]nging from the low of $320,383 to $385,153.

LIST OF BIDDERS:

1. Morrison-Knudsen Co., Inc., Boise, Idaho (low bidder)	$320,383
2. Bushman Constr. Co., St. Joseph, Mo	338,380
3. Northwest Engr. Co., Rapid City, S. Dak	364,519
4. Barnard-Curtis Co., Minneapolis, Minn	385,153

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excav. for canal, 32+00 to 273+00	15,000 c. y.	$0.30	$0.60	$0.32
2. Excav. for canal, 0+00 to 32+00 and 273+00 to 692+56	225,000 c. y.	.145	.16	.21
3. Excavation for core banks	10,000 c. y.	.25	.65	.25
4. Overhaul	15,000 st.c.y.	.03	.03	.03
5. Compacting embankments	3,200 c. y.	.50	.65	.28
6. Excavation for drainage channels and dikes	10,000 c. y.	.16	.16	.25
7. Excavation for structures	64,000 c. y.	.40	1.00	1.00
8. Backfill	38,600 c. y.	.33	.35	.28
9. Compacting backfill	4,400 c. y.	.60	1.75	.50
10. Concrete in structures	4,270 c. y.	46.00	37.00	45.00
11. Placing reinforcement bars	600,000 lb.	.04	.04	.045
12. Dry rock paving	425 s. y.	7.50	6.50	2.60
13. Erecting timber in structures	75 Mbm.	57.50	80.00	55.00
14. Lay 24-in. concrete pipe	450 l. f.	2.00	1.65	1.25
15. Lay 30-in. concrete pipe	270 l. f.	2.50	2.50	1.50
16. Lay 36-in. concrete pipe	270 l. f.	3.00	3.50	1.60
17. Install gates and gate hoists	7,900 lb.	.15	.15	.08
18. Place metal water stops in joints	14,000 lb.	.25	.15	.12
19. Install miscellaneous metal work	5,700 lb.	.20	.20	.17

TUNNELS, DESCHUTES PROJECT, OREGON

OWNER: Bureau of Reclamation, Deschutes Project, Bend, Oregon.

PROJECT: Construction of Tunnels No. 1 and 2, North Unit Main Canal, two circular, concrete-lined tunnels, each with an inside diameter of 11-ft. 8-in., and construction of the inlet and outlet transitions at the portals.

CONDITIONS: The government will furnish cement, sand and coarse aggregate, reinforcing bars, timber for permanent tunnel supports, and sewer pipe for drains. All work to be completed within 330 calendar days from date of notice to proceed. Wage rates specified are: carpenters, $1.35 per hour; concrete finishers, $1.35; laborers, unskilled, 82½c.; muckers, tunnel, 95c.; powdermen, $1.17½; steel and tool dressers, $1.12½.

BIDS: Eight bids were received on Schedule 1 on January 31, 1944, ranging from the low of $227,745 to $340,440. On Schedule II the eight bids ranged from $223,945 to $334,630, and on the combination of the two schedules, they ranged from $451,690 to $675,070.

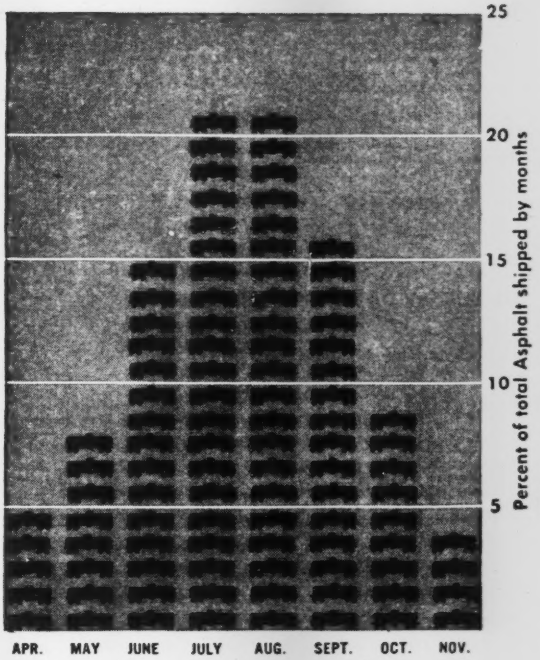
Schedule I—Tunnel No. 1

LIST OF BIDDERS:

1. Wixson & Crowe, Redding, Calif. (low bidder)	$227,745
2. Morrison-Knudsen Co., Inc., Boise, Idaho	274,152
3. J. A. Terteling & Sons, Boise, Idaho	288,093
4. Rumsey & Co., Seattle, Wash.	288,125
5. Kern & Kibbe, Portland, Ore.	316,475
6. Ralph A. Bell, San Marino, Calif.	325,174
7. L. E. Dixon Co., Los Angeles, Calif.	336,060
8. T. E. Connelly, Inc., San Francisco, Calif.	340,440

(*Continued on page* 210)

How to meet the tank car shortage and get the asphalt you need



Percent of asphalt shipped each month during normal times and a rough comparison of the tank cars required. **It is easy to see that, if shipments can be made early in the season, fewer tank cars will be needed.**

WHETHER YOU get the asphalt you need this year for highway construction and maintenance depends almost entirely upon the tank cars that will be available for asphalt shipments after providing for other essential petroleum products for war.

One way you can help insure adequate asphalt supplies for yourself—and definitely help the war effort—is brought out by the chart above.

The chart shows the percent of total asphalt shipments made month by month *in normal times*. It also shows a rough comparison of the number of tank cars required.

Here's the catch. *These* aren't normal times. There is a limited number of tank cars available—far less than would be needed to ship normal requirements in the normal way. Here's what you can do. Start your work early. Order your asphalt and take delivery before the peak of the season when cars will be in greatest demand.

True, in normal times there are good reasons for waiting for the settled weather of summer. But the few days you may be delayed this year because of weather won't be nearly as great as the possible loss due to delivery delays at the season's peak because of car shortages.

This company will do everything possible to supply asphalt to its users, but here is an opportunity for you to help yourself to the asphalt you need.

Buy more War Bonds

TANDARD OIL COMPANY (INDIANA)

STANDARD SERVICE

TUNNELS, DESCHUTES PROJECT, OREGON (cont'd.)

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common, in open cut	50 c. y.	$0.50	$1.10	$2.00
2. Excavation, rock, in open cut	100 c. y.	1.00	3.50	4.00
3. Excavation, all classes, in tunnel	18,250 c. y.	9.00	10.60	11.25
4. Erect permanent timbering in tunnel	60 Mbm.	50.00	100.00	100.00
5. Construct 6-in. tunnel drain	1,000 l. f.	1.00	1.00	1.00
6. Lay 6-in. sewer pipe, cemented joints	200 l. f.	.75	.75	5.00
7. Conc. in portal structures and transitions	190 c. y.	8.00	50.00	30.00
8. Concrete in tunnel lining	4,020 c. y.	14.00	15.10	16.50
9. Placing reinforcement bars	19,000 lb.	.04	.07	.05
10. Drill grout holes over 10-ft. deep	200 l. f.	.70	.60	1.00
11. Place grout pipe and connections	100 lb.	.20	1.10	.50
12. Pressure grouting	400 c. f.	1.00	2.50	2.00
13. Backfill	250 c. y.	.30	1.10	.50
14. Puddling or tamping backfill	50 c. y.	.50	2.20	2.50

Schedule II—Tunnel No. 2

PARTIAL LIST OF BIDDERS:

1. Wixson & Crowe, Redding, Calif. (low bidder)	$223,945
2. Morrison-Knudsen Co., Inc., Boise, Idaho	269,345
3. Rumsey & Co., Seattle, Wash.	282,925

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common, in open cut	50 c. y.	$0.50	$1.10	$6.00
2. Excavation, rock, in open cut	100 c. y.	1.00	3.50	6.00
3. Excavation, all classes, in tunnel	17,950 c. y.	9.00	10.60	10.50
4. Erect permanent timbering, tunnel	60 Mbm.	50.00	100.00	50.00
5. Construct 6-in. tunnel drain	1,000 l. f.	1.00	1.00	1.50
6. Lay 6-in. sewer pipe with cemented joints	200 l. f.	.75	.75	1.00
7. Concrete in portal structures and transitions	180 c. y.	8.00	50.00	40.00
8. Concrete in tunnel lining	3,950 c. y.	14.00	15.10	20.00
9. Place reinforcement bars	18,000 lb.	.04	.07	.05
10. Drill grout holes more than 10-ft. deep	200 l. f.	.70	.60	3.00
11. Place grout pipe and connections	100 lb.	.20	1.10	.50
12. Pressure grouting	400 c. f.	1.00	2.50	1.00
13. Backfill	250 c. y.	.30	1.10	2.00
14. Puddling or tamping backfill	50 c. y.	.50	2.20	4.00

TUNNEL AND CHANNEL IMPROVEMENTS BOULDER DAM

OWNER: Bureau of Reclamation, Boulder City, Nev.; Boulder Canyon Project, Arizona-California-Nevada.

PROJECT: Tunnel and river channel improvements at Boulder Dam, Boulder Canyon Project, Arizona-California-Nevada. Work is on Colorado River about six miles northeast of Boulder City, and is for purpose of recovering about four feet of operating head for Boulder Power Plant that was lost because of increased tail-water elevation resulting from bars and accumulations of broken rock and other material in channel downstream from portals of the two spillway tunnels and the two outlet tunnels. Condition to be corrected by dredging river channel from tunnel portals to river-gaging station (3,000 ft). Prevention of recurrence of condition entails removal from canyon walls or river banks all material which may be dislodged and come to rest in river channel. Tunnels to be modified to eliminate discharge characteristics which contribute to formation of undesirable bars in channel. This will simplify unwatering of tunnels for repair and inspection, and also improve hydraulic performance. Portion of road leading to powerhouse to be relocated.

CONDITIONS: Government will furnish cement, admixtures, sand (except for sandblasting), coarse aggregate, reinforcement bars, metal pipe and fittings, metal water stops, elastic filler material, and all other materials that will become part of completed construction work. Sand and certain coarse aggregate will be furnished in stock piles in Las Vegas Wash, other coarse aggregate in Hemenway Wash. Completion time 750 calendar days. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.25 to $1. hour; semi-skilled 90c. to $1.25; and common labor, 9

PARTIAL LIST OF BIDDERS: (Bids opened Jan. 30,

1. Guy F. Atkinson Co., San Francisco, Calif. (low bidder)	$2,5
2. Morrison-Knudsen Co., Inc., Los Angeles, Calif.	2,6
3. Utah Construction Co., San Francisco, Calif.	2,7

Item	Quan.	Unit Prices (1)	(2)
1. Diversion and care of river during constr. and unwatering foundn. for addition to Tunnel No. 1	Lump Sum	$200,000.00	$70,000.00
2. Excavation, all classes, stripping Nevada canyon wall of loose rock	1,000 c. y.	5.00	8.00
3. Excav., all classes, above El 647 on Arizona River bank	200,000 c. y.	1.20	1.75
4. Excav., all classes, above El. 647 on Nevada River bank	350,000 c. y.	1.10	1.75
5. Excav., all classes, below El. 647 in river channel	275,000 c. y.	1.45	1.75
6. Excavation, rock, for road	15,000 c. y.	1.60	3.00
7. Excavation, rock, for struct.	12,000 c. y.	4.00	4.50
8. Excavation of concrete	2,600 c. y.	25.00	22.00
9. Backfill	25,000 c. y.	.80	1.00
10. Compacting backfill	1,000 c. y.	2.50	1.70
11. Drilling grout holes	1,200 l. f.	2.50	2.30
12. Install grout pipe and fittings	1,500 lb.	.50	.40
13. Pressure grouting	5,000 c. f.	1.50	2.20
14. Install 4-in. cast iron pipe drains	3,500 lb.	.20	.20
15. Install 12-in. c. i. pipe drains	55,000 lb.	.05	.10
16. Conc. in foundation for addition to Tunnel No. 1	1,500 c. y.	11.00	13.00
17. Concrete in addition to Tunnel No. 1	22,000 c. y.	24.00	16.50
18. Concrete in existing tunnels	12,500 c. y.	24.40	16.50
19. Concrete in tunnel portal aprons	2,400 c. y.	12.50	18.00
20. Conc. in gravity walls	3,500 c. y.	20.00	22.00
21. Conc. in road surfacing	800 c. y.	17.00	21.00
22. Concrete in cavern	500 c. y	12.00	16.00
23. Placing reinforcement bars	5,500,000 lb.	.028	.02
24. Special finishing of conc. surfaces	3,200 s. y.	3.00	4.40
25. Install elastic joint-filler mat'l	1,000 s. f.	.40	.35
26. Place metal water stops	8,000 lb.	.40	.40
27. Welding 1½-in. square reinforcing bars	20,500 welds	1.90	2.75

OUTLET SHAFT, ETC., CALIFORNIA

OWNER: Public Utilities Comn., San Francisco Water D N. A. Eckart, gen. mgr. and chief engr.

PROJECT: Construction of outlet shaft and adits along partial control works for drawing water from lake, loc on east shore of San Andreas Reservoir, approximately miles west of Millbrae, San Mateo County, Calif. Incl construction of reinforced concrete-lined shaft 14-ft. diameter and 66-ft. deep, in which are two control valves two concrete-lined adits. Adits extend from shaft to lak one point. Open-cut excavation serves as inlet channel f lake to adits to traverse earthquake fault-line.

CONDITIONS: Owner to furnish 48-in. gate valves. C tractor to furnish balance of material, some of which been salvaged. Portion of work must be done while l level is down. Work was put underway, but now unable proceed without further priorities. Time for completion stipulated originally as six months. Highway transportat facilities available. Wage rates are: carpenters, $1.50 hour; steam shovel operators, $2.00; tractor operat $1.62½; machinists, $1.53.

BIDS: Six bids were received July 11, 1944, ranging fr the contract low of $113,780 to $187,405. Engineers estim $136,250.

PARTIAL LIST OF BIDDERS:

1. T. E. Connolly, San Francisco, Calif. (contract)	$113,7
2. R. G. Clifford & Peter Sorensen, Redwood City, Calif.	125,
3. Utah Construction Co., San Francisco, Calif.	142,

(Continued on page 211)

TLET SHAFT, ETC., CALIFORNIA (cont'd.)

Item	Quan.	Unit Prices (1)	(2)	(3)
in open cut, unclassified	40,000 c. y.	$0.70	$1.43	$1.20
for shaft, unclassified	800 c. y.	20.00	14.00	20.00
for tunnel sections of adits, sified	550 c. y.	14.00	15.00	17.00
e for shaft	450 c. y.	27.00	17.65	34.00
e for floors and tunnel sections	90 c. y.	12.00	19.10	24.00
r sides and arches, tunnel sect.	290 c. y.	24.00	27.00	40.00
r struct. in open cut constr.	270 c. y.	30.00	30.00	40.00
ement	50 bbl.	2.00	3.00	3.00
ing steel	46,000 lb.	.07	.075	.10
nd install grout pipes for pres- grouting	110 ea.	2.00	3.00	4.00
e grouting	800 c. f.	2.00	2.00	2.50
stings	11,000 lb.	.40	.25	.25
aneous metal work	5,500 lb.	.50	.25	.32
gate valves (furn. by City)	30,000 lb.	.02	.04	.05
ct timber roof for shaft	Lump Sum	400.00	600.00	500.00
nd install intake screens	41,000 lb.	.50	.30	.38

ROCK MATTRESS, JETTIES CALIFORNIA

ER: California State Division of Highways, Sacramento.

CT: Construction of a heavy stone riprap, wire and attress, and permeable pile jetties for a distance of 0.1 miles in Humboldt County, at Dyerville, Calif., in tion with highway improvement (I-Hum-1-C, D).

ITIONS: The owner will furnish barbed wire, wire hardware, wire mesh, railroad rail, timber piles, struc- imber, and wood preservative. Preference rating AA-3. ctor to furnish heavy stone riprap and redwood logs. ay transportation available. Wage rates are: skilled $1.3125 to $1.75 per hour; semi-skilled, 87½c. to $1.25; mmon labor, 87½c.

Three bids were received August 16, 1944, ranging he contract low of $41,100 to $69,350.

OF BIDDERS:

humann & Johnson, Seattle, Wash. (contract)	$41,100
ed J. Maurer & Sons, San Francisco, Calif.	67,465
iss Crane Co., Berkeley, Calif.	69,350

Item	Quan.	Unit Prices (1)	(2)	(3)
g and grubbing	Lump Sum	$2,000.00	$2,000.00	$3,500.00
fied excavation	7,000 c. y.	.50	1.00	1.00
re excavation	850 c. y.	2.00	2.00	5.00
ted borrow	1,800 c. y.	.70	1.00	3.00
stone riprap	4,000 c. y.	6.00	9.00	7.00
nd rock mattress	8,700 s. f.	.30	1.00	1.00
od logs	355 l. f.	2.00	3.00	4.00
timber piles	144 ea.	30.00	50.00	70.00
timber	10 M bm.	100.00	200.00	100.00

FERRY LANDINGS, TEXAS

ER: Texas State Highway Dept. Austin.

ECT: Construction of two ferry landings and slips g ferry running between north and south sides of Hous- hip Channel, near Pasadena, Harris County, Tex. In- erection of two steel I-beam spans, one 30-ft. with con- dock and rail, and one 30-ft. movable with open mesh deck. Length of project is 0.034 miles. Roadway width Piling clusters tied in with ¾-in. galvanized cable.

DITIONS: Contractor to furnish all materials and com- project in 175 working days. AA-3 preference rating ved by WPB. Rail, highway and water transportation ies available. Wage rates specified are: skilled labor $9.00 per 8-hr. day; semi-skilled, $6.00 per day; and common labor $4.80 per day.

BIDS: Five bids were received May 18, 1944, ranging from the low of $131,967 to $177,941.

LIST OF BIDDERS:

1. Ole Peterson & Son, Houston, Tex. (award pending)	$131,967
2. Brown & Root, Inc., Houston, Tex	138,186
3. Austin Bridge Co., Dallas, Tex	147,679
4. R. P. Farnsworth & Co., Inc., Houston, Tex	150,890
5. Tellepsen Constr. Co., Houston, Tex	177,941

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Common channel excavation	22,800 c. y.	$1.00	$1.00	$1.75
2. Unclassified struct. excavation	80 c. y.	4.00	3.00	3.25
3. Class A concrete (pavement)	90 c. y.	25.00	20.00	35.10
4. Class A concrete (slabs)	56.62 c. y.	45.00	35.00	35.10
5. Class A concrete (bents)	67.8 c. y.	45.00	40.00	35.10
6. Reinforcing steel	30,708 lb.	.075	.07	.0575
7. Structural steel (spans and counterweights)	136,880 lb.	.09	.12	.1065
8. Structural steel (face plates)	40,250 lb.	.08	.10	.095
9. Open mesh steel decking	2,168 s. f.	2.00	2.75	2.05
10. Hardware	16,050 lb.	.85	.55	.4825
11. Treated timber (20# full cell)	36.201 Mbm.	220.00	300.00	451.50
12. Remove old structures (under 20-ft. span)	2 ea.	500.00	200.00	105.00
13. Remove old structures (over 20-ft. span)	2 ea.	500.00	1,000.00	1,350.00
14. Untreated timber test piling	4 ea.	150.00	325.00	110.80
15. Treated timber piling (20# full cell)	29,385 l. f.	1.80	1.85	1.54
16. Railing (Type 1)	120 l. f.	7.50	7.00	6.50
17. Railing (Type 2)	120 l. f.	5.00	7.00	8.55
18. Shovel sodding	220 s. y.	1.00	3.00	4.00

FERRY TERMINAL, MARYLAND

OWNER: Maryland State Roads Commission, Baltimore; W. C. Hopkins, bridge engineer.

PROJECT: Reconstruction of Claiborne Ferry Terminal on Eastern Bay, at Claiborne, Talbot County, Md. Includes construction of timber bulkhead approximately 115-ft. long, ferry slip approximately 68 by 130 ft., and transfer bridge and buffer bridge. Roadway to be 10-ft. clear. Alternates were allowed for treated or untreated timber on the project. Award made on basis of treated timber and unit prices shown below are on that basis.

CONDITIONS: Contractor to furnish all material except about 40 pieces of timber sheeting for bulkhead behind buffer bridge which will be furnished by the State Roads Commission. Time for completion is 100 days. Highway and water transportation facilities available. Minimum wage rates specified are: skilled labor, 65c per hour; semi-skilled, 50c; and common, 35c.

BIDS: Three bids were received May 16, 1944, ranging from the contract low of $39,451 to $88,290.

LIST OF BIDDERS:

1. State Foundation Co., Halethorpe, Md. (Contract)	$39,451
2. Whiting-Turner Cont'g. Co., Baltimore, Md.	64,453
3. Empire Constr. Co., Baltimore, Md.	88,290

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Class 1 excavation	25 c. y.	$1.00	$5.00	$3.50
2. Borrow excavation	1,200 c. y.	1.50	1.80	2.50
3. Remove existing coal wharf	Lump Sum	3,000.00	8,067.00	17,500.00
4. Remove existing traffic wharf	Lump Sum	300.00	3,525.00	1,500.00
5 Remove existing canopy	Lump Sum	250.00	200.00	1,000.00
6. Remove exist. transfer bridge	Lump Sum	100.00	100.00	700.00
7. Remove existing gallows frame	Lump Sum	100.00	150.00	350.00
8. Remove exist. rack and dolphins	Lump Sum	800.00	4,356.00	6,000.00
9. Reset exist. operating equipt.	Lump Sum	150.00	300.00	400.00
10. Treated Class A timber piles	10,300 l. f.	1.95	2.90	2.75
11. Test piles	50 l. f.	6.00	3.50	3.50
12. Fabricated structural steel	Lump Sum	1,600.00	1,401.00	1,600.00
13. Treated timber	30 M bm.	248.00	344.00	625.00
14. Untreated timber	7 M bm.	228.00	208.00	525.00
15. Reset salvaged lumber	2.3 M bm.	150.00	145.00	475.00
16. Transfer and drive 6-in. timber sheet	Lump Sum	1,000.00	564.00	1,500.00
17. Oyster shell riprap	5,000 o. b.	.10	.25	.50
18. Guard fence posts	20 ea.	3.00	5.00	6.75

MATERIALS AND LABOR PRICE

Market quotations on construction materials and wage rates reported monthly by ENR [illegible]espondents

LABOR RATES provide the most important construction price changes for the cities reporting to *ENR* in April. Rate changes are recorded in Cincinnati and New Orleans in all seven of the classifications reported. Philadelphia reports changes in structural ironworkers' rate, hoisting engineers, and both classes of common labor. In Seattle, carpenters' and plasterers' rates are 2c. per hour below that previously reported.

Douglas fir prices in New York, which formerly ranged from $65 to $69, are now quoted at $65 to $75. Fir timbers are up in Mon[illegible] Granite blocks per M higher in Cleveland, but paving brick dropped i[illegible]sas City.

Vitrified sewer pipe increased on all sizes in New [illegible] the only change. Structural clay tile prices are up on all sizes in P[illegible]delphia. Common higher in Baltimore and Philadelphia, but is lower in [illegible]sas City. Roofing climbed in Philadelphia, but in Cleveland, the reported [illegible] is lower.

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT Per bbl., C/L lots, incl. 40c. per bbl. for bags, cash dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in. truckload del., per block	
	Cloth *a*	Paper	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand-grav.	Lt.wgt. Agg.
Atlanta	$2.77	$2.52	$2.47	$1.79	$1.89	$1.99	$1.79	$1.89	$1.59	$1.69	$0.17	....
Baltimore	2.62	2.37	2.12	1.80‡	1.80‡	1.30‡	1.80‡	1.80‡	1.75‡	1.75‡	.125	$0.125*w*
Birmingham	2.50	2.25	2.10	1.75	1.75	1.50	.85	1.00	.90	1.15	.1425	....
Boston	2.97*b*	2.72*b*	2.52	1.50‡	1.50‡	1.05‡	1.25‡	1.35‡	....	....	.13	.155*w*
Chicago	2.90	2.65	2.50	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	1.75‡	1.75‡	.16	.16*z*
Cincinnati	2.41	2.16	1.96	1.20	1.20	1.10	1.80	1.80	....	....	.12	.15*w*
Cleveland	2.49	2.24	....	1.75*i*	1.75*i*	1.55*i*	1.80*i*	1.80*i*	1.73‡*i*	1.73‡*i*	.14	.14
Dallas	2.51	2.26	2.06	1.50*p*	1.70*p*	1.10*p*	1.69*p*	1.79*p*	....	....	.15	....
Denver	3.08	2.88	2.32	1.20	1.30	1.25	1.65	1.75	1.00	1.00	.15	....
Detroit	2.49	2.24	2.09	1.50	1.50	1.50	2.25	2.25	2.00‡	2.00‡	.13	.14*w*
Kansas City	2.58	2.33	2.18	1.85	2.30	1.00	1.91	1.91	....	....	.125	.125*wy*
Los Angeles	3.20	2.60*v*	....	1.30	1.30	1.15	1.30*f*	1.30*f*	....	....	.04*bb*	.10*aa*
Minneapolis	3.07	2.82	....	1.00*h*	1.00*h*	.25*h*	1.00*h*	1.00*h*	....	....	.12	.16
Montreal	....	1.95*rs*	1.79*rs*	1.65‡*s*	1.65‡*s*	1.50*t*	.80*ct*	.90*ct*	....	....	.14*t*	.14*wt*
New Orleans	2.42	2.16	1.96	1.67	1.65	1.22	....	....	.90	1.15	.19	....
New York	2.85‡	2.60‡	....	1.60*de*	1.60*de*	.90*de*	1.70*de*	1.80*de*	....	....	.16	.14*wcc*
Philadelphia	2.73	2.48	2.28	1.55‡	1.65‡	1.20‡	1.90	1.95	1.10	1.10	.155	.155*w*
Pittsburgh	2.65	2.40	2.20	1.65‡	1.65‡	1.85‡	2.25‡	2.25‡	1.50	1.50	.17	.17*z*
St. Louis	3.08	2.80	....	1.75‡	1.75‡	1.25/1.50‡	1.10*h*	1.10*h*	.90*g*	1.15*g*	.145	.13*w*
San Francisco	2.21	2.01	1.71	1.36	1.36	1.36	1.46	1.46	....	....	....	.21*y*
Seattle	....*u*	3.00*o*	....	2.35*d*‡	2.35*d*‡	2.35*d*‡	2.00*o*	2.00*o*	....	....	.16	.16*y*

‡ Delivered. *a* 10c. allowed for each returnable bag *b* 10c. per bbl. off for cash. *c* F.o.b. quarry. *d* Per cu. yd. *e* Barge lots alongside docks. *f* Crushed granite. *g* F.o.b. Granite City, Ill. *h* F.o.b. plant. *i* Within three miles of Public Square. *j* 5% discount for cash. *k* Discount of 2 percent for cash in 10 days. *l* Up to 200 cu. yd. *m* 50c. off for cash. *n* 25 c.y. or more. *o* 2% off for cash. *p* 10c. per ton off, cash *r* 10c. per bbl. off, cash 20 days. *s* 8% sales tax included. *t* 8% not included. *u* Withdrawn *v* 20c. per bbl. discount; 20c. allowed for able cloth bag. *w* Cinder. *x* Waylite. *y* Haydite. *z* Ce *aa* Pumice. *bb* 4 x 8 x 12 in. *cc* Also 8 x 18 x 18 in.

CASH DISCOUNTS CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash 10c. per bbl. for payment within 15 days of date of invoice. Subject discount 10c. per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICE BASES AT CEMENT MILL

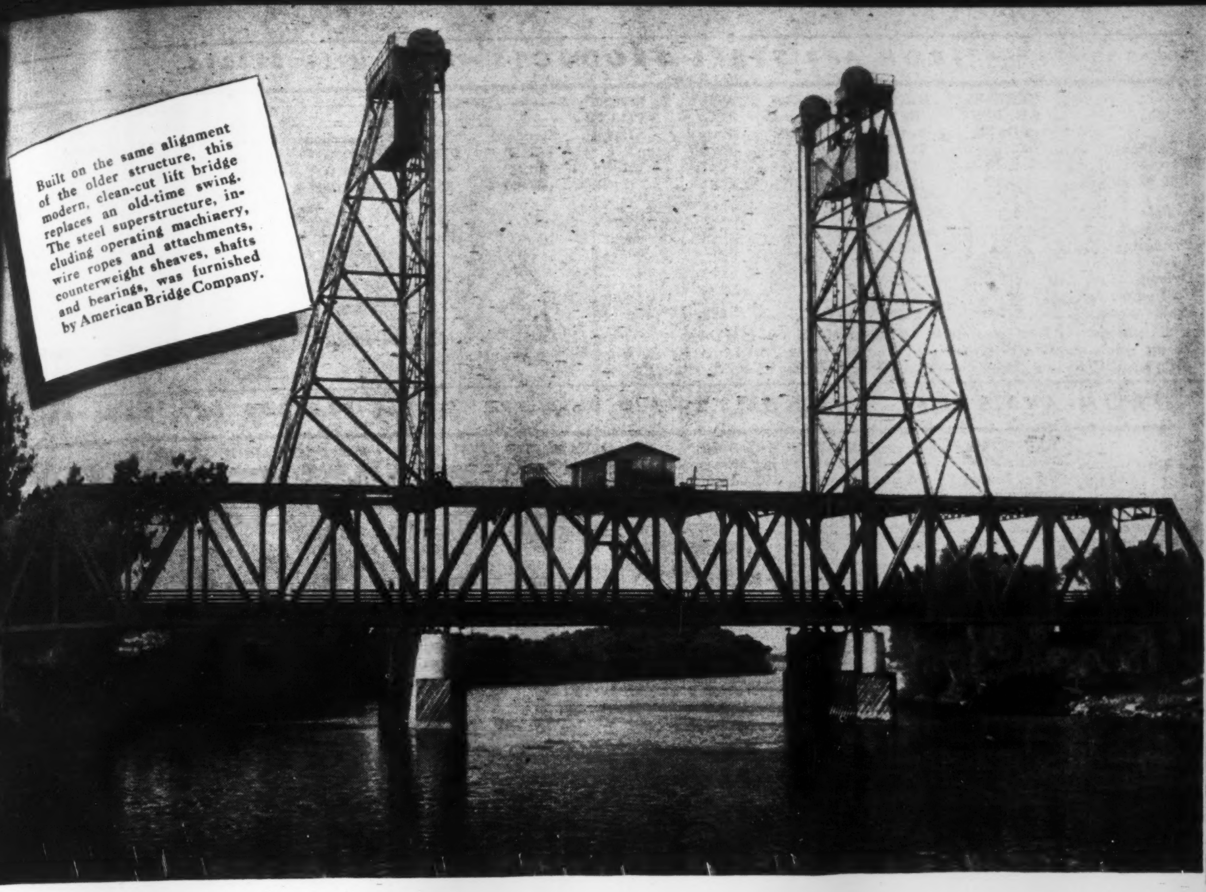
Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refund

	Bagged	Bulk
Buffington, Ind.	$1.90	$1.85
Dallas, Tex.	....	....
Hannibal, Mo.	1.90	1.85
Hudson, N. Y.	....	....
Independence, Kans.	1.70	1.65
Ironton, Ohio	$1.70	$1.65
Limedale, Ind.	....	....
Norfolk, Va.	....	....
Northampton, Pa.	1.75	1.70
North Birmingham, Ala.	....	....
Richard City, Tenn.	$1.80	
Steelton, Minn.	2.00	
Universal, Pa.	1.75	
Waco, Tex. (Plus 9c. tax in Tex.)	1.75	
Montreal (8% sales tax incl.) Discount 10c. per bbl. 20 days	1.68	

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F.O.B. CITY

	PAVING BRICK AND BLOCK Granite per M. lots of 50,000	Brick per M 3x4x8½ in	Wood per sq. yd. 3½ in.	PAVING ASPHALT Per ton, less than 80 penetration		ASPHALT BINDERS—FLUXES Per gal., 80–300 penetration		CUTBACK ASPHALT Per ton		ROAD OIL Per gal.	ASPHALT EMULSION (Quick-breaking) Per gal.
	4x4x8 in.	carload lots	16-lb. treat	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car
Atlanta	$73.00	$39.35	$2.25	$18.53*e*	.....†	$0.0740*e*	......†	$0.0806*he*	.......†	$0.0781*e*	$0.0806
Baltimore	150.00‡	49.00	85.00*m*	15.00*r*	21.00*r*	.06*r*	.09*r*	13.00*r*	23.00*r*	.065*r*	.07*r*
Birmingham	150.00	48.00	.....	17.95	.....†	.0747	......†	.0834*h*	.......†	.065	.095
Boston	85.00	59.00	3.75	15.00	24.00	.0625	.115	17.00	30.00	.0625	.0825
Chicago	150.00	55.00	2.50/2.80*d*	14.00	22.50	13.00*g*	21.50*g*	.0575*h*	.15*h*	.05*n*	.09/.10*n*
Cincinnati	120.00	53.75	.....	17.00	.....	.085	......	12.25	....	.07	.085
Cleveland	126.00	37.25	3.37*l*	17.00	19.00	.085	.095	.10*h*	.11	.10	.10
Dallas	......	36.00	.....	13.65	20.30	.06	.11	16.00	24.80	.06	.05/.07
Denver	......	16.11	.....	11.00	.....	10.00	.....	.045*h*	....	....	....
Detroit	......	37.00	.....	18.06*f*	25.60*f*	.0743	.128	.0718*h*	.119*h*	.067	.0775
Kansas City	......	30.00	.....	18.50	23.50	.077	.1075	.077*h*	.107*h*	.057	.11
Los Angeles	......	50.00	.....	9.00*b*	23.00	9.50*bg*	24.00*bg*	9.50*b*	....	.025	.072
Minneapolis	......	.....	2.30*d*	.....	27.70	.....	.126	....	32.64	....	....
Montreal	92.40	.....	.....	16.60*k*	24.25*k*	.116*k*	.1485*k*	.115*hk*	.135*hk*	.08*k*	.135*k*
New Orleans	......	.....	.....	13.50*a*	20.00*a*	.057	.088	.06*h*	.095*h*	....	.080
New York	......	65.00	.....	17.40	24.20*p*	14.00	......	.0725*h*	.1325*hp*	....	.0725*p*
Philadelphia	140.00	58.00	4.06	15.00*r*	.....	14.00/15.00	......	.0625*h*	....	....	14.00*gr*
Pittsburgh	135.00	38.75	.....	18.00	23.00	.09	.16	20.00	36.00	.07	.06
St. Louis	......	39.00	.....	16.00	22.00	15.00*g*	21.00*g*	.0575*h*	.1212*h*	.648	.06
San Francisco	......	45.00	.....	10.90	21.15	10.90*g*	18.00*gr*	12.90	17.50*r*	9.50*gr*	.0525
Seattle	......	.....	.....	10.90*i*	23.40*i*	.....	20.40*gi*	11.40*i*	....	....	.0525*i*

‡ Delivered. *a* F.o.b. Baton Rouge. *b* Delivered to purchaser's warehouse. *c* 3½x4x8½ in. *d* 2½ in. 12-lb. treatment. *e* Local reduction due to 20% reduction intra-state class freight rates, only Georgia affected. *f* Mexican. *g* Per ton. *h* Per gallon. *i* F.o.b. Martinez. *j* 3x3½x8½ in. *k* Tax included. *l* F.o.b. T *m* Per thousand. † Available on priority only and quoted specially. *p* No drum shipments except to armed forces. *r* February 1943 prices, none available.



Built on the same alignment of the older structure, this modern, clean-cut lift bridge replaces an old-time swing. The steel superstructure, including operating machinery, wire ropes and attachments, counterweight sheaves, shafts and bearings, was furnished by American Bridge Company.

BRIDGES FOR TOMORROW

ELIMINATION of transportation bottlenecks on strategic railroads is exemplified by this modern, double-track lift bridge which replaces an old-time swing.

The "old-timer," built 50 years ago, rendered yeoman service in the years of lighter roadbed loadings and slower train speeds. Within its limited capabilities it performed faithfully, even within the early period of the war emergency. But its light construction, its slow-operating swing span, and its single-track in an otherwise double-tracked system, handicapped train movements with slow speed restrictions.

The new, double-track structure, with a fast operating lift span, eliminates slow-speed orders and reduces navigation interruptions to a minimum. Engineered to the requirements of today's heavy power, traffic density and high speed operations, it embodies design and construction elements that contribute to great permanence, low maintenance costs and sound operating economies.

Modern bridge structures such as this point the way to the coming job of roadbed rehabilitation because postwar competition will demand a continuance of the outstanding service rendered by America's railroads during the war.

When peace comes, American Bridge, too, will be able to put aside its war job. Then, with vastly greater facilities, resources and experience, we will be fully prepared to meet every structural need of the nation's railroads.

AMERICAN BRIDGE COMPANY

General Offices: **Frick Building, Pittsburgh, Pa.**

AMERICAN BRIDGE COMPANY
USS
STEEL
UNITED STATES STEEL

District Offices in: Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* United States Steel Export Company, New York

UNITED STATES STEEL

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS ¾-in. billet *b*	RIVETS ⅞-in. structural	WIRE NAILS Base *d*	SHEET PILING Base	STEEL RAILS Per Gross Ton Standard	Light	Re-rolled	TRACK SUPPLIES Angle Bars	Std. Spikes *c*	[illegible] *c*	Track Bolts
Birmingham	$2.10	$2.15	$3.75	$2.80	.....	$43.00	$43.00	$43.00*	$2.70	$3.00	15	$4.75
Chicago	2.10	2.15	3.75	2.80	$2.40	43.00	43.00	43.00*	2.70	3.00	15	4.75
Pittsburgh	2.10	2.15	3.75	2.80	2.40	43.00	43.00	43.00*	2.70	3.00	15	4.75
Buffalo	2.10	2.15	.....	.....	2.40	.....	.....	.....	.....	.....	15	.....
Cleveland	2.10	2.15	3.75	2.80	.....	.....	.....	.....	.....	.....	.	.....
Youngstown	....	2.15	.....	.....	.....	.....	.....	.....	.....	3.00	.	.....
Detroit	.....	2.27‡	.....	.....	.....	.....	.....	.....	.....	.....		.....
Gulf ports	2.47*a*	2.52*a*	.....	.....	2.85*a*	.....	.....	.....	.....	.....		.....
Pacific ports	2.75*a*	2.80*a*	.....	3.30	2.95*a*	.....	.....	.....	.....	.....		.....

‡ Delivered. *a* F.o.b. cars dock. *b* Rail steel same as billet prices. *c* Other basing points include Portsmouth, O., Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., and Pacific coast ports, on tie plates alone, Steelton, Pa., on spikes alone, Lebanon, Pa., Richmond, Va. *d* Add switching charge $18 per cl.
* Per net ton

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

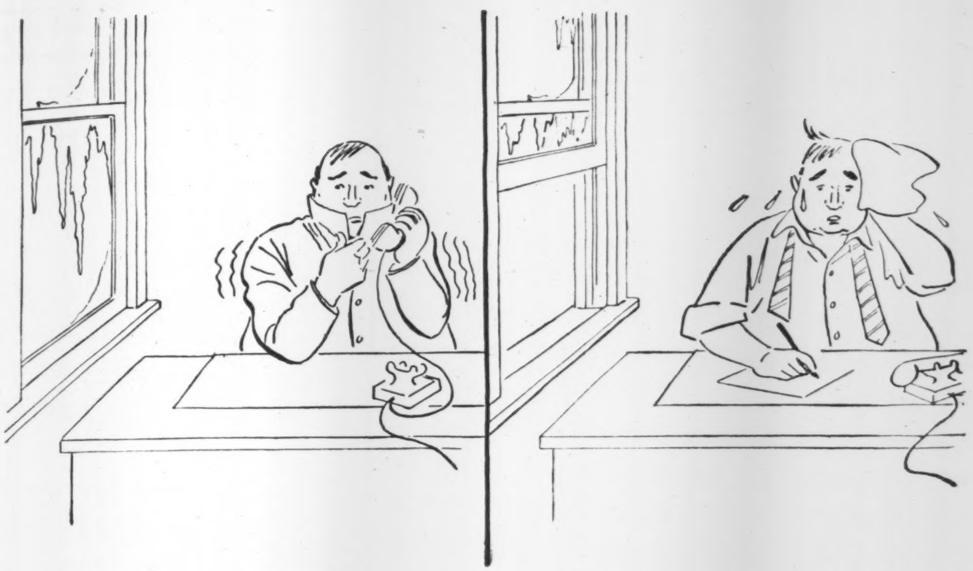
	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS* Per 100 lb., ¾ in., base price 15 tons or over *b* New billet	Rail steel	Add Switch	$/cwt. for Del.	EXPANDED METAL LATH Per 100 sq. yd., carload lots Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq. ft., carload lots 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in. No. 6 & 6 wires *k* Per 100 sq. ft.	SHEET PILING Per 100 lb. base price
Atlanta	$2.34	$2.40	$2.40	$.02½	$.10	$21.06	$23.00	$1.82	$1.35	$1.91	$3.04
Baltimore	3.70	2.90	2.75	.....	.10	22.50	24.50	1.70	1.27	1.79	3.00
Birmingham	2.10*a*	2.15	2.15	.02½	.10	19.00	21.00	1.80	1.34	1.89	....
Boston	3.912	3.994	....	$20 C.L.	.10	18.50	29.50	1.76	1.31	1.84	2.77
Chicago	2.10*a*	2.15*a*	2.15*a*	.03	.05	21.50	23.50	1.67	1.25	1.75	2.40
Cincinnati	3.68	2.53*cd*	2.53*cd*	.....	.05	19.50	21.50	1.66	1.25	1.74	....
Cleveland	2.10*a*	2.15*a*	2.15*a*	.02½	.10	19.50	21.50	1.66	1.25	1.74	....
Dallas	4.25	3.17	3.17	....	....	25.50	27.50	1.93	1.42	2.03	....
Denver	4.57	3.33*k*	....	....	....	26.50	26.50	1.97	1.45	2.07	....
Detroit	3.661‡	2.50‡	2.50‡	....	.10	30.00	30.00	1.68	1.26	1.76	2.66
Kansas City	4.19	2.61*cd*	2.61*cd*	.0	.05	24.50	26.50	1.78	1.33	1.87	2.874
Los Angeles	3.65*f*	2.575	2.425	.02½	.05	23.00	27.50	1.93	1.42	2.03	3.65
Minneapolis	3.81‡	2.73	2.73	.0	.10	25.00	27.00	1.80	1.34	1.89	2.73*d*
Montreal	3.95*i*	2.90*i*	2.80*i*	.....	....	31.00*hi*	46.00*hi*	2.76	3.44*i*	.282*im*	....
New Orleans	4.229‡*k*	2.52	2.52	.05	.10	19.00	21.00	1.82	1.35	1.91	2.875
New York	3.75	2.76*c*	2.76*c*	.....	.15	17.50	19.50	1.76	1.32	1.81	2.74
Philadelphia	3.666	3.668	....	.....	....	20.50	22.50	1.71	1.28	1.79	2.72
Pittsburgh	2.10*a*	2.15*a*	2.15*a*	.02½	.10	23.00	26.50	1.59	1.20	1.67	2.40
St. Louis	3.697	2.74	2.74	.0	.05	28.00	34.00	1.69	1.27	1.78	2.70
San Francisco	4.35	2.825	2.675	.02½	.10	21.00	24.50	1.93	1.42	2.03	3.70
Seattle	2.75*e*	2.80*e*	....	.....	....	34.50	38.50	1.93	1.42	2.03	2.95*e*

‡ Delivered. *a* Mill prices. *b* 5–15 tons, add 15c. 1–5 tons, add 25c. Less than 1 ton, add 50c. *c* 20 tons or over Base. *d* Mill price plus freight. *e* F.o.b. dock. *f* Includes delivery in free delivery zone. *g* Less than 1 ton, add 25c.; 1 to 5 tons, add 10c. * High scrap steel prices cut former 15c. differences between new billet and rail steel in many mills. *h* List price. *i* Plus Dominion and Province sales tax. *k* Quotation on changed basis; no actual price change. *m* per. sq. yd.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in. *a*	VITRIFIED SEWER PIPE Per foot, std. 8 in., s.s.	Delivered std. 12 in., s.s.	ASTM 24 in.,	C13–35 36 in.	CLAY DRAIN TILE Per 1,000 ft., car load lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered; ASTM 12 in.	C 14–35 24 in.	WROUGHT STEEL PIPE Full standard weight, *h* 1 to 3 in., Butt Weld Black %	Galv. %	3½ to 6 in.; Lap Weld Black %	Galv.
Atlanta	$50.66	$0.26*b*	$0.468*bc*	$1.8525*c*	$4.68*c*	$85.00	$128.00	$0.45	$1.642	48.2	54.2	59.7	50.2
Baltimore	54.00	.35	.60	2.70	7.25	160.00	200.00	.60	1.85	65.5	57.5	63.0	51.5
Birmingham	46.00	.275	.495	1.95	5.50	100.00	220.00	.50	1.70	62.2	54.2	59.7	54.2
Boston	56.40	.371*r*	.7155*r*	2.79*r*	7.6875*r*	170.00‡*r*	265.00‡*r*	.60	1.95	....	....	....	....
Chicago	55.33	.35	.675	2.70	7.00	100.00‡	150.00‡	.45	1.85	66.0	55.0	64.5	53.0
Cincinnati	54.27	.231	.4455	1.80	5.125	105.00‡*s*	170.00‡*s*	.75*t*	1.75*t*	57.1	43.4	54.0	39.6
Cleveland	55.75	.245*r*	.4725*r*	2.115*r*	5.535*r*	90.60	139.40	.36	1.38	68.5	57.5	66.0	54.5
Dallas	57.43	.31	.58	2.25	5.00	90.00	110.00	.46	1.57	....	....	....	....
Denver	62.56	.29†	.52†	2.16†	3.00*n*	125.00	200.00	1.00	2.22	58.4	50.4	55.7	47.2
Detroit	55.75	.385	.7425	2.925	7.75	170.00*u*	260.00*u*	.36	1.75	57.6	44.0	54.5	40.2
Kansas City	56.73	.35	.59	2.20	6.20	140.00	260.00	.45	1.60	35.6	46.1	46.2	59.4
Los Angeles	69.40	.325†	.585†	2.70†	6.75†	130.50	217.50	1.00	2.00	61.1	50.1	58.6	47.1
Minneapolis	60.10	.305†	.549†	2.196†	6.25†	......	......	.90	2.10	64.2	53.2	60.7	49.2
Montreal	67.00	.85*o*	1.50*o*	5.25*p*	8.50*ep*	45.00*m*	64.00*m*	.48*m*†	1.92*m*†	....	....	....	....
New Orleans	52.78	.37*r*	.78	1.69	....	150.00	220.00	.45	1.65	62.4	54.4	58.8	50.3
New York	53.40	.336	.648	2.835	6.97	......	......	.60	1.40	64.9	53.9	62.4	50.9
Philadelphia	52.00	.35	.675	2.75	7.50	165.00	225.00	.45	1.75	56.6	42.8	53.6	39.1
Pittsburgh	57.00	.266†	.513†	2.295†	5.945	97.80	154.20	.85*g*	2.00*g*	68.5*i*	57.5*i*	66.0*i*	54.5*i*
St. Louis	54.62	.32	.576	2.304	6.00	100.00	260.00	1.00*j*	2.15*k*	56.4	42.6	52.5	38.4
San Francisco	69.40	.3625*d*	.6525*d*	2.61	6.52	115.00	192.50	.58	2.34	45.0	31.0	41.0	26.0
Seattle	71.20	.40	.72	2.88	7.20	115.20	......	.51*f*	1.44*f*	....	....	....	....

‡ Delivered. † F.o.b. *a* B. & S. class B and heavier, C/L lots, 200 tons and ver Burlington, N. J. (base) $50.00. Based on existing freight rates; subject to ate change. Gas pipe and class A, $3 per ton additional, 4 in., $3 per ton dditional, 30 in. and larger usually $2 per ton less. *b* Double strength. *c* List o dealer. *d* List. *e* 30-inch. *f* Less 5% for cash. *g* Culvert pipe. *h* Discounts from standard list consumers carload prices, except Pittsburgh prices re f.o b. mill. Base price $200 per net ton. List prices per ft.: ⅛ in., 8½c.; in., 11½c ; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92 3 per cent tax on transportation costs not included. *i* Applies also at Lorain, Ohio, mills. Chicago delivered base is 2½ points less on butt, 1½ on lap. Freight is figured from Pittsburgh, Lorain, O., Chicago Dist. Billing is from point producing lowest price at destination. WROUGHT IRON PIPE: Base price and list prices per ft. same as w ought steel pipe. Discount for Pittsburgh base. Butt-weld—1 in. and 1¼ in. black 34, galv. 16; 1½ in. black 38, galv. 18½; 2 in. black 37½, galv. 18. Lapweld—2½ in. to 3½ in. black 31½, galv. 14½; 4½ in. to 8 in. black, 32½ galv. 17. *j* Reinforced; spec. C 76–37. *k* Reinforced; spec. C 75–37. *l* Plus sales tax. *m* Tax included. *n* 27-in. pipe. *o* Less 50%. *p* Less 53%. *r* Truck delivery. *s* Price quotations on delivered basis since Mar. 1940; current f.o.b. price $84 for 6 in.; $130 for 8 in. *t* Reinforced pipe prices since May, 1937; current plain pipe prices are: 12 in., 36c.; 24 in., $1.50. *u* Scarce: carload quantities not readily available.

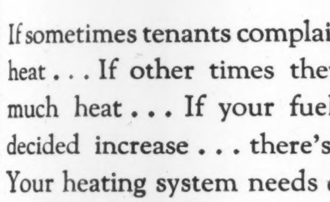


We know the answer to this one . . .

If sometimes tenants complain about not enough heat . . . If other times they're annoyed at too much heat . . . If your fuel bill has shown a decided increase . . . there's only one answer: Your heating system needs *control*.

A Webster automatically-controlled Steam Heating System will assure even heat in every room, regardless of exposure or outside temperature. No overheating . . . No underheating . . . No costly waste of rationed fuel.

In the Webster Moderator System, there are just four control elements—an Outdoor Thermostat, a Main Steam Control Valve, a Manual Variator and a Pressure Control Cabinet. These controls are an integral part of the Webster System — assuring the highest expression of comfort and economy in modern steam heating.



The Webster Outdoor Thermostat automatically changes heating rate when outdoor temperature changes.

More Heat with Less Fuel

Actual surveys made by Webster Engineers show that seven out of ten large buildings in America (many less than ten years old) can get up to 33 per cent more heat out of the fuel consumed.

We'll let you be the judge . . . Send for our free booklet "Performance Facts", and read case studies of 268 modern steam heating installations in commercial and institutional buildings. Shows savings in dollars and cents. Can we help you? Address Dept. EN-4.

WARREN WEBSTER & COMPANY, Camden, N. J.
Pioneers of the Vacuum System of Steam Heating : : Est. 1888
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Fuel-Saving Starts With CONTROL

AUTOMATIC Webster Steam Heating

LUMBER, TIMBER PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR — All S. L. Y. P. is No. 2 common or better end for No. 1 N. C. Box. (Prices in Bold Face) *All Fir planks No. 2 common, Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)*									LONG LEAF Y. P. Merchantable grade up to 20 ft.		[illegible]YWOOD Ra[illegible]ght increment (See [illegible] for base price)	
	1x6 S4S	1x8 S4S	2x4 S4S	2x6 S4S	2x8 S4S	2x10 S4S	3x12 Rgh	6x12 Rgh	12x12 Rgh	2x12 Rgh	12x12 Rgh		¾"
Atlanta	**$40.00**	**$40.00**	**$32.00**	**$35.00**	**$34.00**	**$37.00**	**$46.00**	......	......	**$57.00**	**$64.00**	[illegible]	$21.85
Baltimore	**44.00**	**46.00**	**44.00**	**46.00**	**47.00**	**52.00**	**65.00**	......	......	**115.00**	**120.00**	[illegible]	22.25
	48.00	*49.00*	*55.00*	*55.00*	*55.00*	*57.50*	*68.00*	*$75.00*	*$75.00*	......	......	.	......
Birmingham	**45.00**	**45.00**	**44.50**	**43.50**	**44.50**	**47.50**	**68.00**	**55.00**	**56.00**	......	......	[illegible]	21.15
[1]	50.00	50.00	49.50	48.50	49.50	52.50	72.00	......	......	67.50	70.00	.	......
Boston	60.00[3]	60.00[3]	60.00[3]	60.00[3]	60.00[3]	62.00[3]	66.00[3]	......	......	58.00[3]	58.00	[illegible]	22.25
	55.00	*55.00*	*54.00*	*54.00*	*54.00*	*54.00*	*58.00*	*58.00*	*58.00*	......	......	.	......
Chicago	**54.00**	**54.00**	**55.00**	**54.00**	**54.00**	**60.00**	**68.00**	......	......	80.00*l*	95.00*l*	[illegible]	17.80
	55.00	*55.00*	*54.00*	*54.00*	*54.00*	*55.00*	*56.00*	*56.00*	*57.00*	......	......	...	......
Cincinnati	**47.50**	**49.00**	**42.50**	**42.50**	**42.50**	**44.50**	67.00	......	......	65.00	65.00	[illegible]	21.15
	......	......	......	......	......	......	......	......	......	......	......	..	......
Cleveland	**42.50*k***	**42.50*k***	**52.50*k***	**51.00*k***	**65.00**	**65.00**	**83.00**	**83.00**	**83.00**	......	......	[illegible]	21.60
Dallas *e*	**45.25**	**45.25**	**44.50**	**43.00**	**43.00**	**47.25**	**60.75**	**58.75**	**58.75**	**88.75**	**85.00**	[illegible]	17.80
Denver ‡	63.50[4]	62.00[4]	65.00[4]	65.00[4]	65.00[4]	66.00[4]	69.00[4]	*83.00*	*89.00*	......	......	10.45	12.70
Detroit	**61.00**	**61.00**	**57.75**	**57.75**	**57.75**	**63.75**	71.00	......	90.00	70.75	90.00	[illegible]	21.15
	57.00	*57.00*	*57.00*	*57.00*	*62.75*	*72.75*	*75.00*	*75.00*	*90.00*	......	......	...	......
Kansas City *a*	**69.00**	**69.00**	**67.00**	**65.50**	**67.00**	**69.00**	**84.00**	......	......	**84.00**	**94.00**	12.60	15.40
	66.00	*66.00*	*59.50*	*59.50*	*59.50*	*59.50*	*75.00*	*80.00*	*80.00*	......	......	...	......
Los Angeles *a*	*60.00*	*60.00*	*60.50*	*60.75*	*59.25*	*59.25*	*72.75*	*72.00*	*72.00*	......	......	9.90*gh*	12.05*gh*
Minneapolis ‡*b*	59.00[6]	59.00[6]	......	......	......	......	......	......	......	......	......	12.60	15.40
‡	*58.00*	*58.00*	*57.00*	*57.25*	*56.25*	*57.00*	*64.75*	*63.50*	*63.50*	......	......	......	......
Montreal †[7]	*58.00*	*61.00*	*54.00*	*58.00*	*60.00*	*66.00*	......	......	......	200.00	200.00	......	......
	54.00	*54.00*	*57.00*	*57.00*	*57.00*	*58.75*	*80.00*	*80.00*	*80.00*	......	......	......	......
New Orleans	**40.00**	**40.00**	**37.00**	**35.00**	**34.00**	**36.00**	**46.00**	......	......	**55.00**	**69.00**	14.60	17.80
	31.00	*31.00*	*33.00*	*31.00*	*34.00*	*32.00*	*33.00*	......	......	......	......	......	......
New York	**67.50**	**67.50**	**62.50**	**62.50**	**62.50**	**64.00**	**74.00**	......	......	**120.00*f***	**125.00*f***	18.35	22.25
‡	......	......	*65.00i*	*65.00i*	*65.00i*	*65.00i*	[Range from $75 to $95]			......	......	......	......
Philadelphia	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	......	......	**130.00**	**130.00**	18.25	22.25
	75.00	*75.00*	*75.00*	*75.00*	*75.00*	*75.00*	*85.00*	*90.00*	*90.00*	......	......	......	......
Pittsburgh	**50.80**	**53.20**	**62.75**	**55.00**	**60.85**	**62.50**	**76.25**	......	......	......	......	18.10	22.05
	64.20	*68.10*	*66.10*	*65.30*	*65.20*	*65.65*	*82.75*	*88.75*	*88.75*	......	......	......	......
t. Louis ‡*c*	**61.00**	**61.00**	**57.00**	**56.00**	**57.00**	**59.00**	**71.00**	*75.00*	*75.00*	**87.00**	**87.00**	14.60	17.80
an Francisco *d*	*41.00*	*41.00*	*36.50*	*36.75*	*35.75*	*35.75*	*37.50*	*36.00*	*36.00*	......	......	7.30*g*	8.90*g*
eattle	*45.50*	*45.50*	*44.50*	*44.50*	*43.25*	*43.25*	*43.50*	*43.00*	*41.75*	......	......	0.00	0.00

Bold Face type, Southern Pine. *Italics, Douglas Fir.* [1] Long leaf. [2] Roofers, . C. Pine. [3] Spruce. [4] Native. [6] Western Pine, No. 3 Common. [7] Spruce. Norway Pine. ‡ Delivered. *a* Yard prices. *b* Contractors discount in Minneapolis and St. Paul discontinued May 21, 1938. *c* 5M ft. or less. *d* F.o.b. ars San Francisco freight rate. *e* 10% discount taken off. *f* Up to 18 ft. † Plus les tax.

Note: Special concrete form grade Fir Plywood, 4′ by 8′ panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on ⅝", $95.15; on ¾", $104.85; price includes oiling and sealing charges. For other centers add rail freight increment from table or proper size. For resin dipped treatment, add $10.50 per M. *g* Lower rate by water shipment. *h* 50,000 lb. minimum. *i* Ranges from $65 to $75. *j* Average price. *k* August 1943 price. *l* September price; none later available.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS — Discounts from jobbers list, Aug. 15, 1938 Single or Double Thickness		EXPLOSIVES — Per lb. 40% Ammonia Gelatin in 50-lb. cases delivered in 200 lb. lots*
	A quality	B quality	
lanta	75%	75%	$0.15
ltimore	78%	79%	.15
rmingham	76%	76%	.105
ston	77%	78%	.15
icago	77%	77%	.15
ncinnati	77–10%	77–10%	.15
veland	77%	77%	.19
llas	76%	76%	.1625
nver	76%	76%	.155*e*
troit	77%	77%	.1575
nsas City	77–10%	77–10%	.155
s Angeles	86%*d*	88%*d*	.1575
nneapolis	77%	77%	.155
ntreal	40–5%*ab*	47%*ac*	.1675†
w Orleans	70%	75%	.16
w York	81%	82%	.22*f*
ladelphia	78%	79%	.15
tsburgh	79%	79%	.1225
Louis	77–10%	77–10%	.155
Francisco	66%	73%	.155
ttle	75%	75%	.1575†

Price of 60% Ammonia Gelatin in $0.01 per lb. higher than 40%

iscount from list Sept. 1939; sales tax included, but 6% tax exemption not wed for. *b* Single thickness. *c* Double thickness. *d* Discount from jobbers' Sept. 15, 1928.

Urban prices influenced by service charges or local storage and delivery ulations, do not consistently reflect quantity prices in less congested areas. o.b. Louviere, Colo. *f* In boroughs of Kings, Queens and Richmond, and Manhattan south of Canal St. add delivery charge of $6.00 per trip. [1] F.o.b.

40% Ammonia Gelatin price ranges in other than urban areas, per lb.
(except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
f the Miss., except Fla. nd Me	$0.105	$0.13	$0.15
of Miss. to Rocky Mtn. tates, Fla. and Maine.	.11 –.1175	.135 –.1475	.155 –.1675
ky Mtn. States	.11 –.1225	.135 –.1525‡	.155 –.1725‡
ific N. W. States	.1075–.12	.1375–.15	.1575–.17
ific S. W. States	.1050–.1125	.135–.1425	.155–.1625

F.o.b. Louviere, Colo., or Butte, Mont.

PILES, TIES—F.O.B.

PILES

Prices per linear foot, fir and pine, bark on, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail — Pine*	By Rail — Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.34	....
12 in.— 2 ft. from butt	6-in.	50 to 59-ft.	.35	....
12-in.—2-ft. from butt	6-in.	60 to 69-ft.	.36	....
12-in.—2-ft. from butt	6-in.	90 to 100-ft.	....	.5575
13-in.— 3-ft. from butt	5-in.	91 to 100-ft.	....	.5708
14-in.— 2-ft. from butt	6-in.	50 to 69-ft.	.41	.6263
14-in.— 2-ft. from butt	6-in.	70 to 79-ft.	.43	.59
14-in.— 2-ft. from butt	5-in.	80 to 85-ft.	.53	....
14-in.— 2-ft. from butt	5-in.	85 to 89-ft.	.56	....
14-in.— 2-ft. from butt	5-in.	90 to 100-ft.	....	.61

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

Prices f.o.b., per tie for carload lots:		6"x8"x8′		7"x9"x8′6"	
		Untr.	Tr.	Untr.	Tr.
Boston	Oak	$1.50	....	$2.00	....
	Pine	2.00	$3.00*a*	2.50	$3.00*a*
New York	S. L. Sap Pine	1.43/1.54	2.59	1.76	2.86
	Mixed Oak	1.71	2.59	2.42	3.58
Birmingham	White Oak	1.00	1.60*a*	....	2.25*a*
Chicago	Red Oak	....	2.00/2.25*a*	....	2.87/3.00
Los Angeles	Douglas Fir	2.00	3.25*a*	2.90	4.70*a*
Philadelphia	Red Oak	....	2.10*ag*	....	3.25*ag*
St. Louis	White Oak	1.63	....	2.19	....
	Red Oak	1.63	2.20*a*	2.19	3.04*a*
	Sap Pine or Cypress	1.70	....	2.06	....
San Francisco	Douglas Fir	1.25*bef*	....	....	3.00*caf*
Montreal	Birch or Maple	.85	.90	....†	....†

Tr.— Treated; Untr.— Untreated. *a* Creosoted. *b* 6"x8"x8′6". *c* Empty cell. *d* Zinc. *e* Green. *f* F.o.b. cars. † Out of market. *g* January 1943 price, none later available.

CHEMICALS

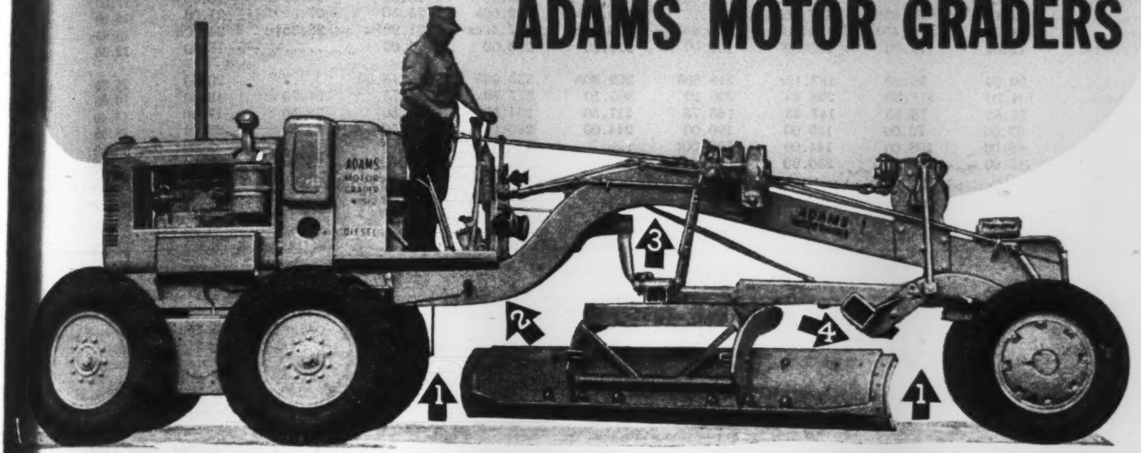
Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder, in drums, f.o.b. works, per 100-lb.	$2.50– 3.10
Chlorine cylinders, liquid, per lb., delivered	.0525
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, del'd, ton	18.50–35.00
Silicate of soda, 52 deg. in drums, f.o.b. works, per 100 lb.	1.40
Soda ash, 58%, in paper bags, per 100 lb. dense	1.15
Sulphate of aluminum, commercial, in 100-lb. bags, per ton	23.00–25.00
Sulphate of copper, in bbl., per 100-lb.	5.00

PLENTY OF BLADE CLEARANCE!

IN ALL OPERATING POSITIONS WITH

ADAMS MOTOR GRADERS



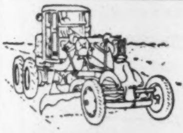
Action photo of ditching operation showing how wide blade end and scarifier clearances speed free movement of dirt.

WIDE BLADE clearance—in all operating positions—is an inherent advantage in all Adams Motor Graders. Note in photo above how Adams' advanced design provides generous clearances at these critical points:

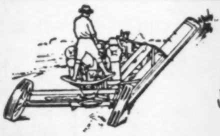
① Between blade ends and tires, permitting sharp blade angles without tire interference.
② Between blade and frame for free movement of heel.
③ Between blade and frame arch, permitting higher blade lift for ground clearances.
④ Between blade and scarifier block for easy reversing of blade under scarifier.

Thus, operators may maneuver blade into widest range of positions, without interference with wheels, frame or scarifier—promoting efficient, high-speed production. Ask your local dealer for the full story about Adams Motor Graders and their many job applications.

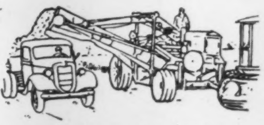
J. D. ADAMS MANUFACTURING CO.
INDIANAPOLIS, INDIANA
Sales and Service Throughout the World



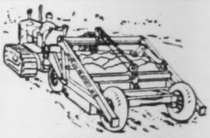
MOTOR GRADERS



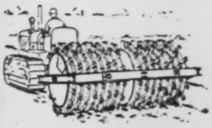
PULL-TYPE GRADERS



ELEVATING GRADERS



HAULING SCRAPERS



TAMPING ROLLERS

ADAMS ☆ ROAD-BUILDING AND ☆ EARTH-MOVING EQUIPMENT

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION — SCORED Per M. lots of 2,000 pieces or over, 3x12x12 in.	4x12x12 in.	8x12x12 in.	STRUCTURAL CLAY TILE — LOAD BEARING — SCORED Per M. lots of 2,000 pieces or over, 8x12x12 in.	10x12x12 in.	12x12x12 in.	BRICK Per M. in quantity. Common backing	Straight hard	LIME Per ton, Hydrated finishing	In paper, Common hydrated
Atlanta	$104.00	$114.00	$199.00	$234.00	$244.00	$250.00	$17.00	$20.04	$26.54	$15.04
Baltimore	84.00	90.00	170.00	200.00	260.00	300.00	16.75*k*	20.75*k*	19.00	14.00
Birmingham	80.00	85.00	160.00	191.00	252.00	288.00	14.50	17.00	18.11	13.64
Boston	103.75*a*	110.65*a*	207.45*a*	248.90	......	......	20.00*i*	20.00*i*	21.00†	......
Chicago	79.50	85.00	160.00	197.00	243.00	278.00	15.00	16.00	17.00	15.00
Cincinnati	65.55	69.90	131.20	148.70	210.35	240.45	25.75	25.75	15.50	13.00
Cleveland	82.50	97.35	182.50	......	......	......	20.00	20.00	15.75*j*	13.25*j*
Dallas	71.40	76.70	145.30	183.50	238.00	294.50	15.25*i*	16.75*i*	19.00	15.00
Denver	84.80	95.40	153.70	178.20	212.00	227.90	14.50	18.00	25.00*j*	17.00*j*
Detroit	92.70	96.70	181.20	206.75	267.50	306.00	20.50	20.50	18.00	16.00
Kansas City	67.00	69.00	89.00*c*	128.00	163.00	189.00	14.00	15.00	19.32	13.00
Los Angeles	78.50†*r*	89.50†*r*	128.00*c*†*r*	210.00†*r*	368.00†*r*	460.00†*r*	13.50	15.00	16.50	17.50
Minneapolis	87.00*b*	92.80*b*	157.30*b*	......	189.00*b*	262.00*b*	25.50	27.50*g*	21.00	16.00
Montreal	94.55*a*	100.45*a*	199.50*a*	160.45*a*	109.40*at*	137.40*av*	21.08†*u*	28.35†*u*	24.60*u*	18.00*u*
New Orleans	72.00	72.00	135.00	162.00	210.00	260.00	14.00	.....	18.30	12.08
New York	90.80	96.80	133.10*c*	219.80*h*	269.80*h*	333.90*h*	17.50/18.50	.....	20.00	14.00
Philadelphia	104.20	111.20	208.40	250.10	305.10	377.70	18.75	21.75	19.00	16.00
Pittsburgh	72.85	78.55	147.25	163.75	217.50	231.00	20.50	22.50	17.90	15.40
St. Louis	67.00	72.00	130.00	190.00	244.00	290.00†	20.50	19.50	22.00	18.00
San Francisco	96.00	108.00	144.00	108.00*t*	......	......	21.50	.....	24.00	23.00
Seattle	115.00	125.00	230.00	......	......	......	20.50*f*	24.00*f*	20.00*s*	20.00*s*

† F.o.b. *a* Smooth. *b* Carload lots delivered to job. *c* 6x12x12 in., 3-cell. *d* Not load bearing. *e* 48 lb. tile. *f* Less $1.00, ½ cash 15 days, balance 30 days. *g* Selected common. *h* F.o.b. Perth Amboy, N. J. *i* F.o.b. Warehouse only. *j* LCL. *k* $1.00 discount if paid in 10 days. *l* Lump. *m* Per bbl., 180 lb. *o* Per bbl., 200 lb. *p* 280 lb. bag. *r* 5% discount 10 days. *s* 2% disco cash. *t* 5½x8x12. *u* 8% sales tax included. *v* 6x12x12-in. *w* Per 200 lb *x* Sept. 1944 prices, Oct. not available on tile.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

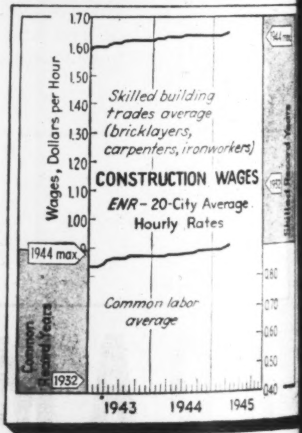
	RED LEAD Per 100 lb. in. 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb in oil	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *b*	Ferric Oxide *d*	ROOFING SUPPLIES Rolls, slate surfaced, 85–90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Carload lots f.o.b factory— Asphalt coating per gal.
Atlanta	$10.25	$14.125	$1.30	$2.25	$1.20	$1.90	$1.61	$1.61	$0.27
Baltimore	10.00	13.75	2.00	3.00	2.50	2.30	2.70	2.70	.40
Birmingham	10.25	14.125	2.35	3.50*r*	1.98*r*	2.10	2.03	2.03	.32
Boston	10.00	13.75	1.75	2.50	2.31	2.00‡*h*	3.30‡*uv*	3.30‡*uv*	.25‡
Chicago	10.00	13.75	....	....	....	1.75*hf*	1.74*hf*	1.82*hf*	.33*f*
Cincinnati	10.00	13.75	1.70	2.90	1.60	2.20	2.10*h*	2.10*h*	.33
Cleveland	10.00	13.75	1.70	2.90	1.60	1.71	1.63*h*	1.63*h*	.237
Dallas	10.00	14.50	1.88	2.11*n*	.05*l*	1.75*h*	1.66*h*	1.66*h*	.35
Denver	10.50	14.25	....	....	.27*l*	2.45	2.95	2.95	.35
Detroit	10.00	13.75	1.75	3.00	1.60	2.25	2.25	2.25	.50
Kansas City	10.00	13.875	2.30*g*	2.55*gr*	2.16*g*	2.19	2.30	2.30	.28
Los Angeles	10.25	14.25	1.60	2.25	2.30	2.10	1.50	....	.45
Minneapolis	10.00	13.875	....	....	....	1.8025*i*	1.7098*hi*	1.7098*hi*	.32
Montreal	.....	11.05	2.50*p*	4.90*p*	3.15*p*	4.02*t*	2.58*t*	3.01*t*	.89*t*
New York	10.00	13.75	2.03	....*r*	1.82	1.7098	1.6273*o*	1.6273*o*	.26
Philadelphia	10.00	13.75	1.60/1.80	2.20*r*	1.55	2.25	2.71	2.71	.32
Pittsburgh	10.00	13.75	1.05	1.95	.80	1.95	1.84*h*	1.84*h*	.34
St. Louis	10.00	13.75	2.28*s*	2.89*s*	1.96*s*	2.05	1.93	1.93	.34
San Francisco	10.25	14.00	1.80	2.75*n*	1.35	1.71	2.40	2.40	.33
Seattle	10.25	14.25	1.90	3.00	....	2.15	2.16*h*	....	.35

‡ Delivered. Note: Red lead in oil 50c. higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266–31. *d* 80% minimum ferric oxide. *e* Subject to 25% discount. *f* Distributors' price to contractors. *g* 5 gal. can. *h* Per roll, 65 lb. *i* Minneapolis and vicinity. *j* Asphalt pitch. *k* Per *l* Per lb. *m* Per bbl. *n* May, 1941 price. *o* 60-lb. roll. *p* Plus 8% *r* Not available, except on priority rating; then quoted specially. *s* Dece 1942 price. *t* Federal tax included. *u* 90-lb. roll. *v* Truck delivery.

SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Common Labor Building	Heavy Const.
Atlanta	$1.50	$1.25	$1.50	$1.25	$1.50	$0.40	$0.50
Baltimore	1.75	1.4375	1.80	1.625/2.00	1.725	.80	.80
Birmingham	1.75	1.25	1.50	1.25/1.50	1.50	.65	.65
Boston	1.625	1.50	1.65	1.50/1.875	1.667	1.00	1.00
Chicago	1.75	1.70	1.76	1.75	1.825	1.10	1.10
Cincinnati	1.825	1.60	1.725	1.45/1.60	1.75	.90	.90
Cleveland	1.875*c*	1.575	1.875	1.875	1.875	1.085	1.125/1.155
Dallas	1.625	1.25	1.50	1.75	1.625	.60	.75/1.25
Denver	1.65*b*	1.50*b*	1.50*b*	1.50/1.625*b*	1.50/1.65	.80*b*	.80*b*
Detroit	1.725	1.50	1.825	1.675/1.825	1.725	1.00	1.00
Kansas City	1.75	1.50	1.625	1.675	1.70	.975	.90
Los Angeles	1.50	1.35	1.625	1.375	1.667	.875	.875
Minneapolis	1.625	1.44	1.625	1.50	1.625	.95	.95
New Orleans	1.625	1.375	1.625	1.55	1.50	.70	.80
New York	2.00*b*	1.85*b*	2.00	2.00*b*	2.00*b*	1.10*f*	1.00
Philadelphia	2.00	1.58	1.90/2.00	2.25	2.00	.90	.90
Pittsburgh	1.90	1.75	1.75	1.8125	1.875	.90	.80
St. Louis	1.75	1.50	1.75	2.00	1.75	1.00	1.00
San Francisco	1.875	1.50	1.75	1.50/1.75	1.75	1.00	1.00
Seattle	1.845	1.545	1.745	2.00	1.845	1.145	1.145
Montreal*	1.05	.95	1.00	.90	1.00	.60	.65

b 7 hr. day. *c* Prevailing rate on government work.
* Cost of living bonus now included in basic wage.



ENR Skilled Average; (Bricklayers, Carpenters, Ironworkers) $1.650
ENR Common Average; $0.904

IT'S THE "Know-how" THAT COUNTS

● When you call in the Raymond organization, you are turning your foundation contract over to men who are expertly trained and thoroughly experienced in every scope of the work. They know their jobs—from the preliminary investigation of underground conditions to the complete installation of the foundation.

They also know their equipment—how to handle the largest rig and the smallest tool needed in the efficient placing of Raymond Piles. And, too—they know their responsibility for carrying out large and small jobs to successful completion.

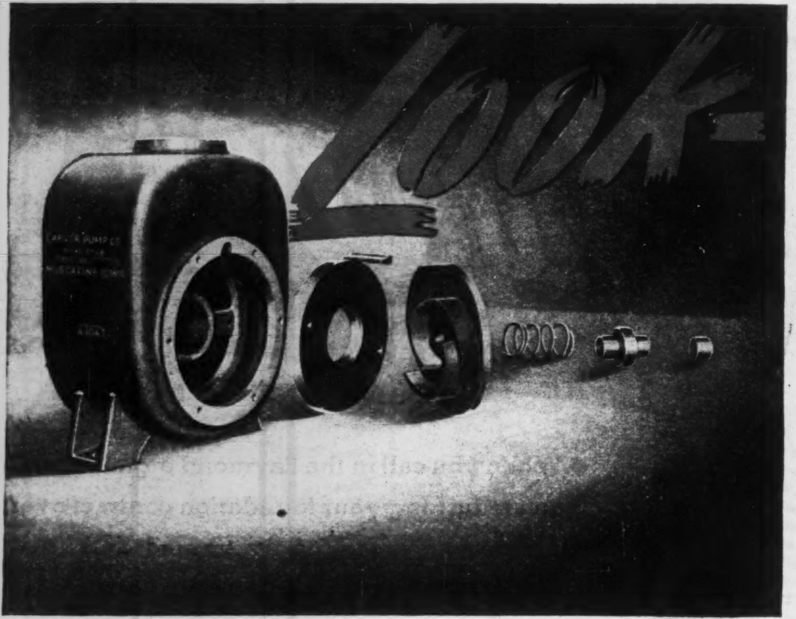
Since 1897 Raymond Concrete Piles have been continuously and increasingly used by the architectural and engineering professions. Today over 50 million lineal feet of these sturdy cast-in-place piles are in world-wide use. With over 11,000 contracts to its credit, Raymond has accumulated a vast fund of knowledge, experience and ability. Write, wire, cable or phone for a competent Raymond engineer to discuss your next project with you.

SCOPE OF RAYMOND'S ACTIVITIES

includes every recognized type of pile foundation—concrete, composite, precast, steel, pipe and wood. Also caissons, construction involving shore protection, ship building facilities, harbor and river improvements, borings for soil investigation.

RAYMOND CONCRETE PILE CO.

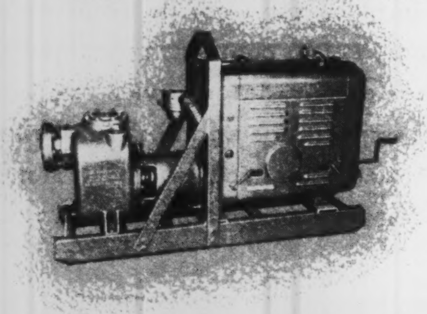
140 CEDAR STREET • NEW YORK 6, N. Y.



...how simple they are!

There are fewer parts in Carver pumps because every part does its job right. No gadgets have to be added to step up efficiency or correct faults. Impellers are scientifically designed with web-reinforced vanes confining wear to but one side. Renewable liners carry a cast lug protecting the scroll casing at the impeller cut-off where wear is greatest. The wearing surface seal rings of the Carver Lifetime Seal are made of Tungsten Carbide—a material so hard it cuts glass like a diamond.

Every Carver Pump carries a "Certified" tag which means that it has been carefully tested and fully meets our high standards for performance on the job. Write for details or see your local distributor.



THE CARVER PUMP CO.
Muscatine, Iowa

CARVER CENTRIFUGAL Certified PUMPS

The Week In Engineering and Construction

Continued from page 76

Bills introduced for Missouri Valley Authori

Creation of a Missouri Valley thority to develop the 530,000-sq. Missouri River basin is authorized a bill (S. 555) recently introduced the Senate by Senator James E. M ray of Montana and by a similar (H. R. 2203) introduced in the Hou by Representative John J. Cochran Missouri. The proposal is to provide unified water control and resource velopment for the entire Missouri V ley. Development of the resources the region as carried out in the T nessee Valley is proposed.

In introducing his proposal Senat Murray charged that the plan recent outlined by the Corps of Engineers a the Bureau of Reclamation (see EN Dec. 14, 1944, vol. p. 757 for a d tailed description of plan) was a hast attempt on the part of the two orga izations to thwart creation of an autho ity of the type now sought.

Senator Murray recommends an a thority with three board members an a general manager. They would b aided by an advisory committee com posed of principal officers of the d partments of Interior, Agriculture, Com merce, Justice, War, Federal Powe Commission, Federal Security Agency and board of governors of the Fed eral Reserve System. In addition, i calls for nine representatives from the Missouri Valley three from agriculture, three from commerce, and three from labor, all appointed by the President.

• • •

Navy expands facilities at Los Angeles harbor

Expansion of naval facilities planned for the Los Angeles-Long Beach harbor area of California this year will call for an expenditure of about $44,000,000, according to Capt. H. E. Wilson (C.E.C.) Navy public works officer at the Naval Operating Base, Terminal Island. The work is included in the Navy public works bill now before Congress.

Projects outlined include $17,000,000 worth of work already under way, and other projects being designed would cost $27,500,000. The principal project is an access roadway and bridge across Cerritos Channel connecting Terminal Island and the mainland estimated to cost $14,000,000.

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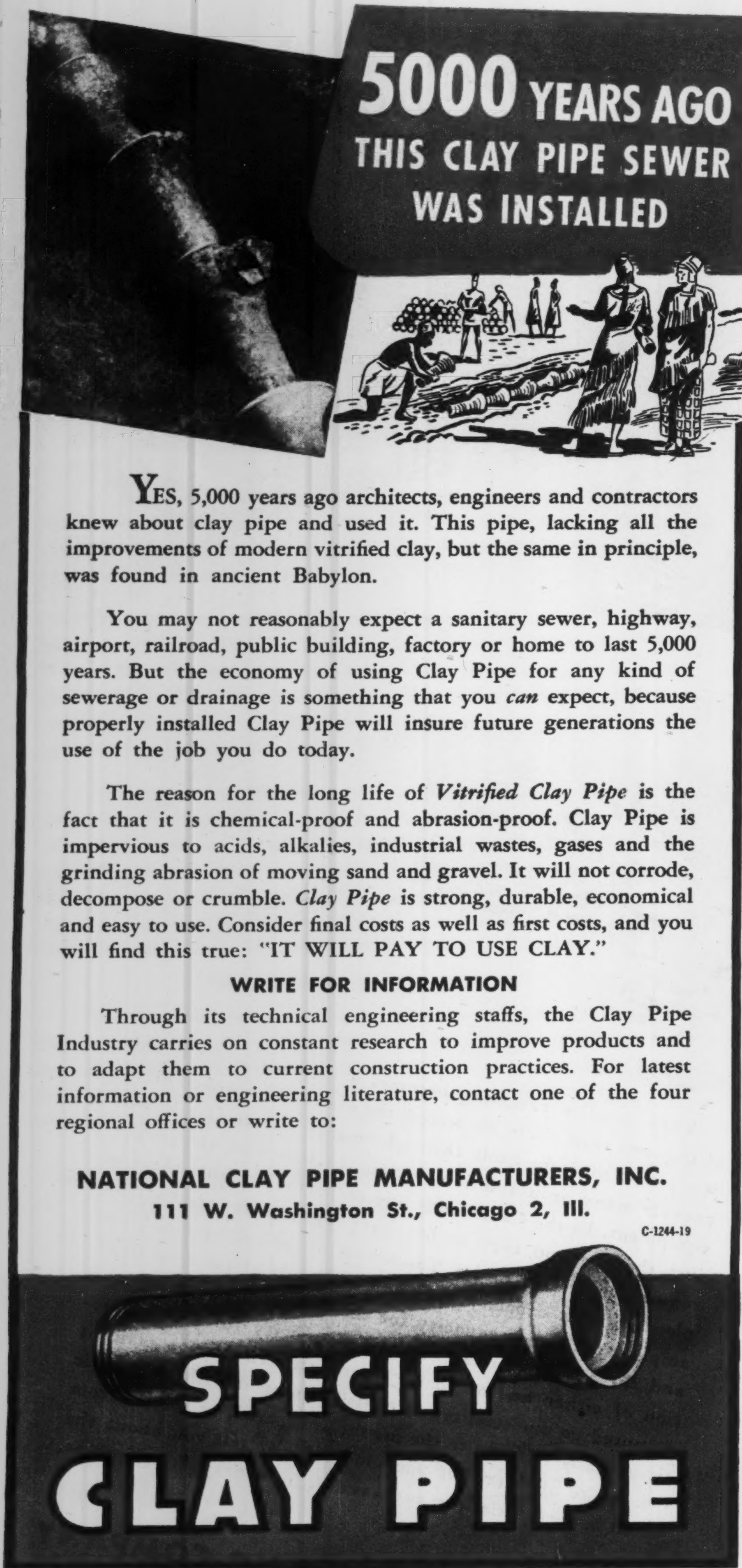
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Other planned expenditures are: A permanent naval supply depot at San Pedro, $5,000,000; A Navy material redistribution and disposal center at Torrance, $1,000,000; additions to Navy machine shops at the naval dry docks; and installation of a sewage disposal unit for the Naval Operating Base, Terminal Island.

Now under construction in the port area are: a $6,500,000 moletype breakwater extension by the Guy F. Atkinson Co.; a $2,556,400 pier; pier extensions costing $1,347,000; a $1,420,000 reinforced concrete storage warehouse; and two 25-ton and two 50-ton portal cranes costing $1,363,000. There is also considerable work on hospitals, storage buildings, laundries, etc.

• • •

Consulting engineers favor private work

The public works programs which have been developed to absorb a large number of the millions who will require employment when the war ends must of necessity be short lived and dependence should ultimately be placed upon private enterprize, according to E. Rowland Hill, president of the American Institute of Consulting Engineers, New York. The council of the institute, representing consulting engineers throughout the United States, proposes a plan for postwar employment which includes the following procedure designed to encourage industry and attract investment capital to the extent required to provide employment in all fields:

1. Legislation should be enacted which would clearly place under one control the functions, now independently exercised by separate agencies, with respect to price fixing, production of goods, and wages so that all of them may be coordinated, while such controls are needed, and in this way provide assurance that private enterprises may have a fair measure of security against loss.
2. The Attorney General should be requested to cooperate with the Director of War Mobilization and Reconversion in laying down clear-cut policies for the guidance of private enterprise in the observance of anti-trust laws.
3. Free enterprise should be relieved of the present necessity of furnishing a multiplicity of federal agencies with information as to business operations, much of which is of little value but compiled at great expense.
4. The tax structure should be adjusted in such a way as to provide for meeting current needs as far as practicable, and at the same time to encourage investment of capital. It should also be simplified so as to relieve the taxpayer of a multiplicity of taxes with incidental details. Among the changes there should be included a discontinuance of double taxation on distributed corporation profits and a repeal of the tax on undistributed and excess profits.

Elections and Activities

All officers and directors of the General Contractors and Builders' Association of the East Bay, San Francisco, Calif., have been re-elected. Officers are: C. H. Thomas, president; W. N. Gabriel, vice-president; Harry K. Jensen, secretary-treasurer. Directors include those three and Willis F. Lynn, Frank W. Anderson, Walter Pressler, S. G. Johnson, W. E. Lyons and P. Royal Haulman. M. Anderson was renamed office manager.

H. S. Carter, professor of civil engineering, Utah State Agricultural college, Logan, has been elected president of the Intermountain district, American Society of Civil Engineers. Other officers are: Robert Harding, consulting engineer, first vice-president; Ralph R. Woolley, senior hydraulic engineer, U. S. geological survey, second vice-president and Carl Painter, manager and vice-president of the Waterworks Equipment Co., secretary.

The West Texas Chapter of the Texas Society of Professional Engineers was organized in Ft. Worth, Texas recently. W. A. Rounds, civil engineer, Ft. Worth, was elected president; Sam Greenidge, first vice-president; F. B. Porter, second vice-president; W. A. Satterwhite, Jr., Secretary, and C. W. Burney, treasurer.

A committee headed by Joe Rady was named to draw up a constitution with W. A. Satterwhite and A. B. Carson assisting.

A. F. Mitchell, Corsicana, president of the Texas Society of Professional Engineers, the main speaker, outlined the urgent need for organization among engineers for postwar construction.

The Board of Directors of Southern California Chapter, Associated General Contractors, has elected the following officers: President, Donald MacIsaac; John Kier, George Herz and Harry Coon, vice-presidents; and treasurer, R. J. Daum.

The city council of Charlotte, N. C., has created a planning board and named following members: Major H. H. Baxter, City Manager; R. W. Flack, Duncan P. Tillett, George M. Ivey, and Gaston G. Gallaway.

Officers of the Georgia Society of Professional Engineers, Savannah chapter, are: W. S. Lovell, president; A. M. Gruber, vice-president; B. B. Tyler, secretary, and S. M. Byck, treasurer. A special committee has been appointed to collaborate with the Savannah Port Authority in improving port facilities.

The Dallas, Tex., chapter of the Associated General Contractors of America has been re-organized with 20 members and the following officers: Hal C. Dyer, president; D. F. Steele, vice-president; Nathan Wohlfeld, secretary-treasurer; and directors for 1945: George Dolph, P. O'B. Montgomery, Louis Hickey, W. C. Henger, J. W. Bateson and H. L. Rogers. The full-time managing director is Julian Capers, Jr.

R. D. Davidson, of Ottawa, has been elected president of the Canadian Institute of Surveying. He succeeds H. E. Beresford, of Winnipeg. C. C. Lindsay of Montreal was elected first vice-president, and Maj. Gen. L. H. Burns, former commander of the First Canadian Corps in Italy, was elected an honorary member.

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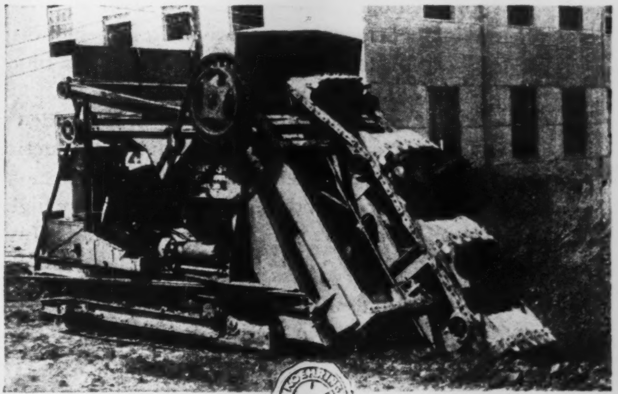

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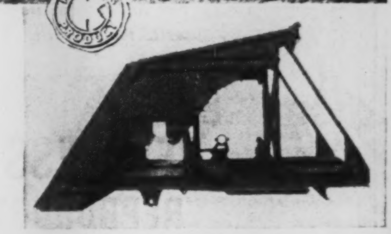

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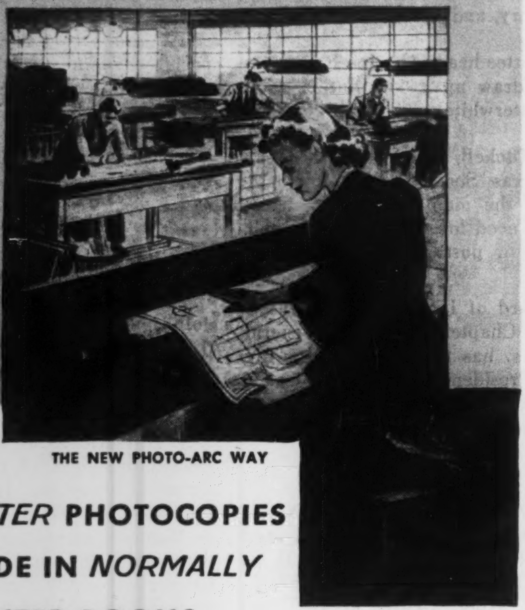

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John L. Collins, plant engineer of th Central Maine Power Co., Augusta, h been elected president of the Main Association of Engineers. Other officer are George E. Haggas, Central Main Power Co., Portland, vice-president; an Bryant L. Hopkins, Waterville, secretary-treasurer. Directors are: Paul F Kruse, chief engineer Bangor Hydro Electric Co.; W. B. Getchell, Jr. Augusta; G. A. Noyes, Houlton; H. D Watson, Orono; E. T. McDonald, Biddleford; and L. E. Little, Augusta.

Col. Rufus W. Putnam, U. S. Army district engineer, has been electe president of Los Angeles Post, Society of Military Engineers.

Officers of the South Carolina Section of the American Society of Civil Engineers are: L. A. Emerson, president; C. P. Roberts, vice-president and A. E. Johnson, re-elected secretary-treasurer.

Officers of the Columbus, Ohio, Home Builders Association for 1945 are: Walter J. Shapter, president; Ralph Fallon, vice-president; and Clyde Montgomery, secretary-treasurer.

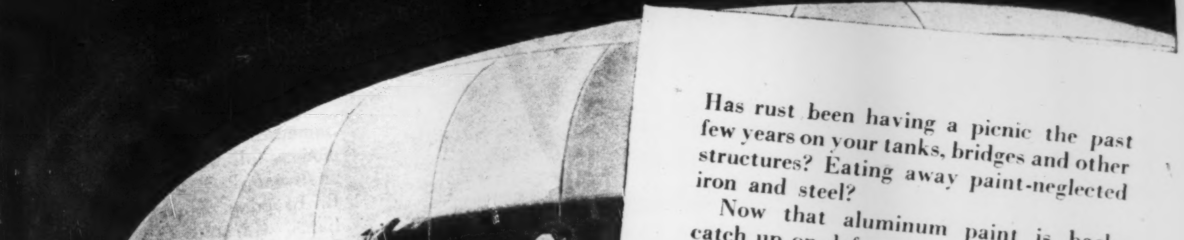
The Central Branch of the Associated General Contractors, Des Moines, Ia., has elected F. H. Carlson, Decorah, president; R. W. Welden, Iowa Falls, and R. W. Weitz, Des Moines, vice-presidents, and J. Leo Hoak, Des Moines, re-elected treasurer. Occupational divisions directors: S. C. Andersen, Des Moines, bridge division; R. W. Weitz, Des Moines, and W. H. Lippert, Boone, building division; T. L. Sears, Clear Lake, grading division; George B. Koss, Des Moines, paving division; J. Leo Hoak, Des Moines, sewer and waterworks division. A longstanding agreement with the Master Builders Association whereby members of that organization automatically became members of the builders division of the Central Branch, A.G.C., was discontinued and now building contractors must join the branch directly.

The Seattle chapter of the Washington State Society of Professional Engineers has installed J. C. Stanley as president; L. R. Kettenring, vice-president; P. J. Swanson, secretary-treasurer, and Roy Johnson, trustee.

Arthur L. Atherton has been elected president of the Engineers Club of Seattle. Other officers are Frank W. Knowles, vice-president; Evans K. Blackford, secretary, and E. D. Alexander, treasurer. Trustees are H. Ward Tyler, E. L. Gaines and Thomas M. Widrig.

THINGS ARE LOOKING BRIGHTER

Aluminum Paint



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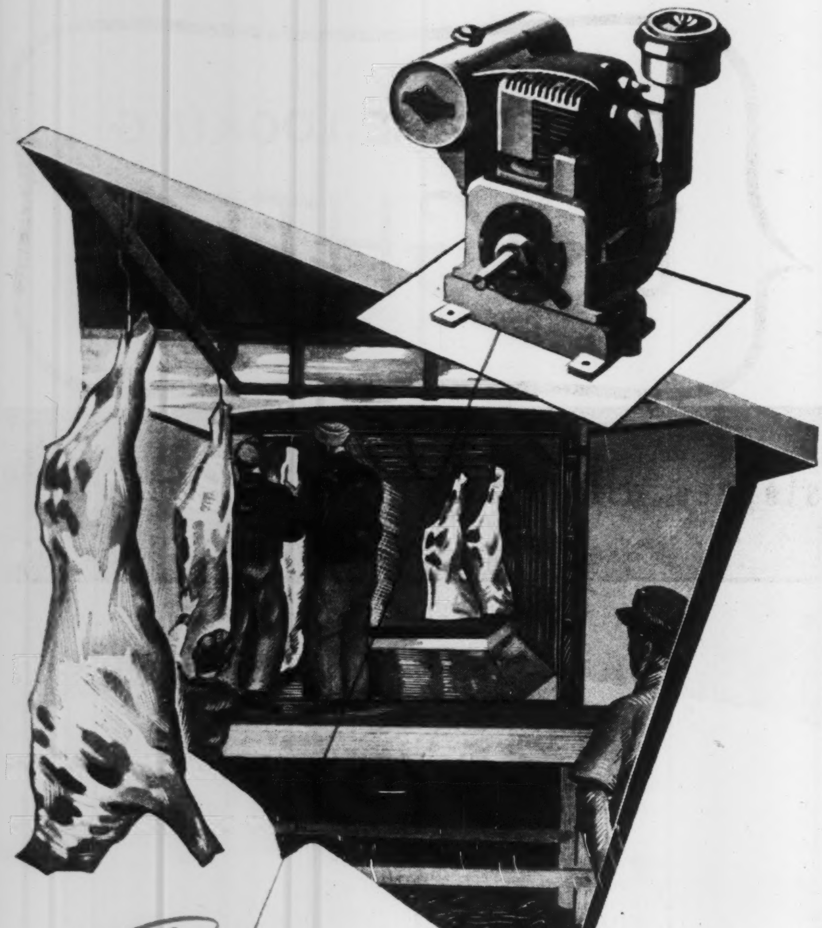
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Fred N. Kettenring is the new pres dent of the Seattle Construction Cou cil, William H. Norton vice-presiden George Porter, secretary, and Claud Cory, treasurer.

Louis W. Payne, Raleigh, has bee elected president of the North Car lina Society of Engineers. succeedin E. D. Burchard. Other officers are George H. Hewett, Wilmington, vic president; T. T. Betts, Fayetteville, d rector of District 1; H. D. Jones, Gra ham, director of District 2; R. A Thomas, Winston-Salem, director of Di trict 3; and Marshall E. Lake, Cha lotte, director of District 4.

The Texas Society of Professiona Engineers has elected Elgin B. Robert son, Dallas, president; James P. Exum Austin, first vice-president; F. B. Porter Fort Worth, second vice-president. Di rectors are Harold A. Barr, Port Ar thur; Charles L. Shirley, Houston; L B. Griffith, Waco; and C. W. Mier, Dal las. T. J. Kelly, Beaumont, and W. M Andrews, Houston, were chosen Texa directors of the national society.

Gov. Ben Laney of Arkansas ha named the new State Highway Commis sion as follows; Dan Felton, Marianna chairman, L. P. Mann, Newport; Byro B. Brogdon, Springdale; Emmet Wil liams, Garland City, Harold Sadler Little Rock, W. E. Thompson, McGehee and M. E. Peace, Magnolia.

Layton R. Harms has been electe president of the Builders' Exchange o Milwaukee, Wis. Aston Hennecke wa re-elected secretary for his thirty-ninth term.

Earl M. Guy is chairman of the board of the Illinois Association of Highway Engineers. Other officers are: Wayne Barney, Peoria, vice-chairman; O. W. Terry, Effingham, secretary; W. C. Gaffney, Paris, treasurer; and E. R. Knight, Springfield, delegate to the Illinois Engineers Council.

Peter Olson, Waterloo, has been elected president of the Master Builders Association of Iowa. Other officers are Russell Thompson, Ames, vice-president; Orlin J. Conlon, Dubuque, secretary; W. F. Kucharo, Des Moines, treasurer. The officers and the following are directors: A. R. Coffeen, Decorah; Heinrich W. Weitz, Des Moines; E. W. Lippert, Boone; R. W. Miller, Waterloo; O. F. Paulson, Cedar Rapids; and Carl Rye, Mason City.

J. N. Strobling, Charlotte, has been elected president of the North Carolina Chapter of the American Society of Civil Engineers, succeeding H. W.

er, Durham. Robert M. Cook-Thomasville, was elected vice-ent and George Maurice, Eagle gs, secretary-treasurer.

Associated General Contractors ssachusetts have elected the fol-: President, William White, West on; vice-president, Alan Potter, n; secretary, Frederick Hawkins, reasurer; F. J. Conti,Boston. Ex-e Committee: I. Slotnik; M. Mur-Weiss, and Frank H. MacGowan ston.

nk B. Winston, of Winston Bros. Minneapolis, Minn. has been d president of the Associated ral Contractors of Minnesota. r officers are: J. R. Sweitzer, St. vice-president for the builders ion; Bernard S. Andrus, South Paul, vice-president for the high-division; Charles H. Palda, St. , vice-president, heavy division, George W. Walker, Minneapolis, tary-treasurer.

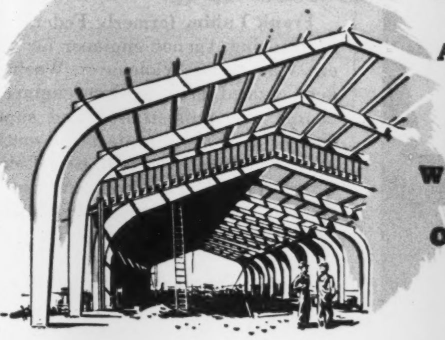
a recent annual meeting of the ciation of Professional Engineers of rio in Toronto membership was re-d at a new high of over 3,500 full bers and about 2,500 student engi-s-in-training.

he meeting was addressed by V. S. ray, president of the newly formed eration of Employee Professional ineers and Assistants. The meeting erally endorsed actions of the coun-on collective bargaining. John L. g, Sault Ste. Marie, was elected ident, succeeding M. J. Aykroyd, onto; Professor G. Ross Lord, onto, is the new vice-president. Civil ineer councillors are Dean D. S. s, Queen's University, Kingston, f. M. W. Huggins, the University of onto, and J. Clark Keith, Windsor.

. H. Wieters, public health engi-r of the Iowa State Department of lth, has been elected president of Iowa Engineering Society. Other cers elected were Frank Kerekes, fessor of civil engineering, Iowa te College, Ames, vice-president; F. Faul, chief of testing laboratory, a State Highway Commission, Des ines, secretary, and E. F. Behrens, own Engineering Co., Des Moines, surer.

HARRY L. VINES has been named di-tor of sales for Tyson Bearing Corp., ssillon, Ohio. Formerly western man-ed for R. G. LeTourneau, Inc., Stock-, Calif., he had sales management perience with Master Equipment Co. d Caterpillar Tractor Co., before join-g LeTourneau.

THEY COULD BE BUILDING
A CHURCH,
HANGAR,
WAREHOUSE
OR SCHOOL



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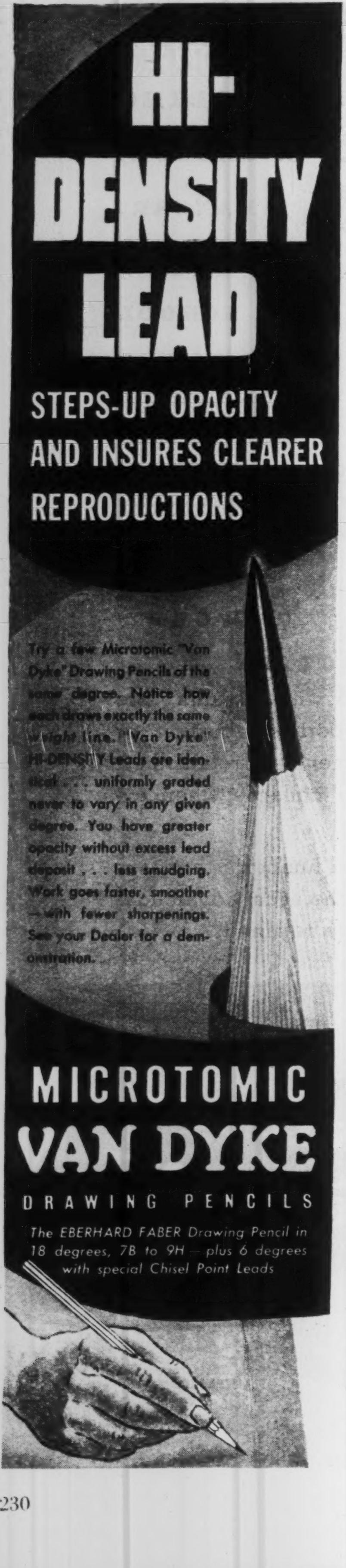
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MEN AND JOBS

Frank Lubin, formerly Federal Public Housing Agency engineer for southern Washington, Vancouver, Wash., has been named area project engineer in charge of administration and supervision of all FPHA projects in southern Washington and Oregon. **Bert Pierson,** formerly FPHA project engineer for Oregon, has been made area management supervisor for the FPHA.

Murray N. Shelton, a captain in the Corps of Engineers, U. S. Army, now serving in Alaska, has accepted appointment as city engineer of Dunkirk, N. Y., and will assume his new post as soon as released from the service.

Arthur E. Hulme, assistant hydraulic engineer with the surface water division of the U. S. Geological Survey, has been transferred to the Lincoln, Neb., district. He is first assistant to George L. Whitaker, in charge of that office. Mr. Hulme is a civil engineer graduate of Louisiana State University and has been with the surface water division since 1938, working in Jackson, Miss. and Baton Rouge, La.

W. B. Barrow is city engineer of Raleigh, N. C., succeeding **Roy L. Williamson,** now property officer of the N. C. State College and executive secretary of the N. C. State College Foundation, Inc.

Forrest F. Varney, senior hydraulic engineer, has been assigned as field section engineer in charge of the Fresno section, Operations Division, U. S. Engineers, Sacramento District, relieving **Maj. J. L. Newman,** who has been ordered to Fort Belvoir, Va., for reassignment to overseas duty.

John O. Joerns, assistant engineer with the surface water division of the U. S. Geological Survey, has been transferred from the Santa Fe, N. M., district to the Chattanooga, Tenn., district at Knoxville. He is collecting data and furnishing records on surface water investigations to the Tennessee Valley Authority. This office also handles studies and investigations for war agencies in that area. A civil engineer graduate of the University of New Mexico, Mr. Joerns has worked for the Bureau of Reclamation as well as for the Geological Survey.

Maj. Rex J. Allen has been transferred to Camp Beale, Calif., from Seattle, where he had been chief of the general engineering branch of the Seattle District, Corps of Engineers, U Army, since December, 1943, bef which he had been stationed in Co Rica on construction of the In American Highway, serving as chief the engineering division of the S Jose area. Prior to his call to act duty in September, 1942, he had be a civil engineer with the Califor Department of Public Works, Divis of Highways, for 12 years.

John Leabourne Shearer has be named engineer of the Ottawa Sub ban Roads Commission, succeedi Alan K. Hay. Mr. Shearer is a grad ate of Queen's University.

Robert L. Fletcher, for five years civilian engineer with the Army ove seas, during which he supervised co struction of large hangars and oth buildings for air operations, has join the engineering staff of Timber Eng neering Co., Washington, D. C.

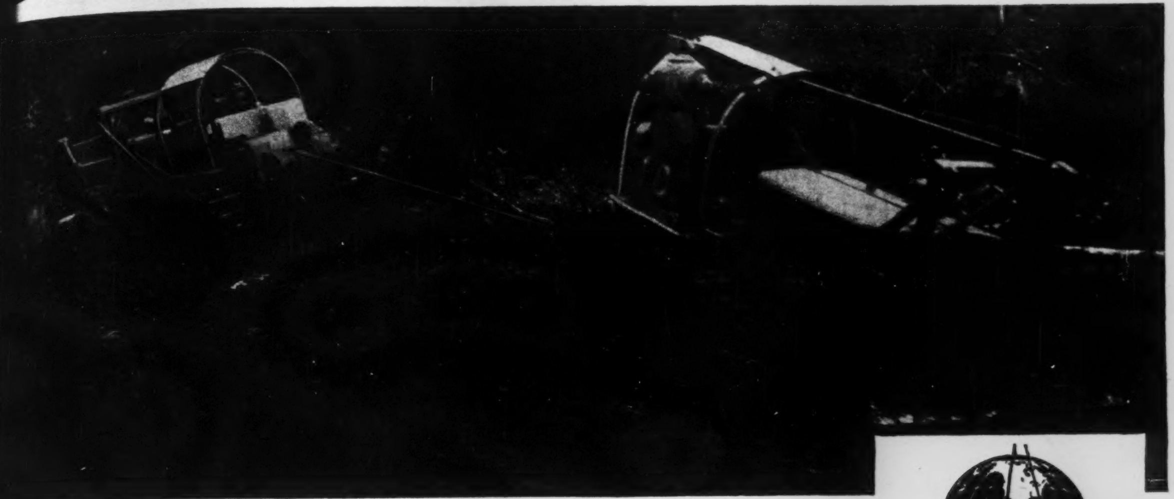
Homer Teeters, Portland, Ind., cit engineer, and former Jay County su veyor, has been named highway super intendent for the Ridgeville sub-distric Indiana State Highway Commissio which includes Jay, Randolph, Black ford and Delaware counties.

Charles E. Hawke has been ap pointed chief engineer of the marin division of the McNamara Constructio Co., Ltd. of Toronto, Ont., which buil the Goose Bay airport in Labrador, an other important war jobs. Mr. Hawke a graduate in civil engineering of th University of Toronto, for the last te years has been on the staff of the Department of Public Works, Canada, recently an assistant engineer in the Toronto district engineer's office, following a period of war service.

Charles MacDonald of Tarrytown, N. Y., formerly county engineer of Westchester County, is now associated with Clarke, Rapuano and Holleran; Robinson and Steinman; and Howard, Needles, Tammen and Bergendoff on the preparation of plans and specifications for Deegan Boulevard, an expressway in the Borough of The Bronx, N. Y., which is being designed for the State of New York as a postwar project.

Col. George E. Brown of Miami, Fla., has retired after almost half a century's service with the U. S. Engineers. He supervised construction of fortifications at Key West during the Spanish-American war. In 1909 he

The RIGHT combination



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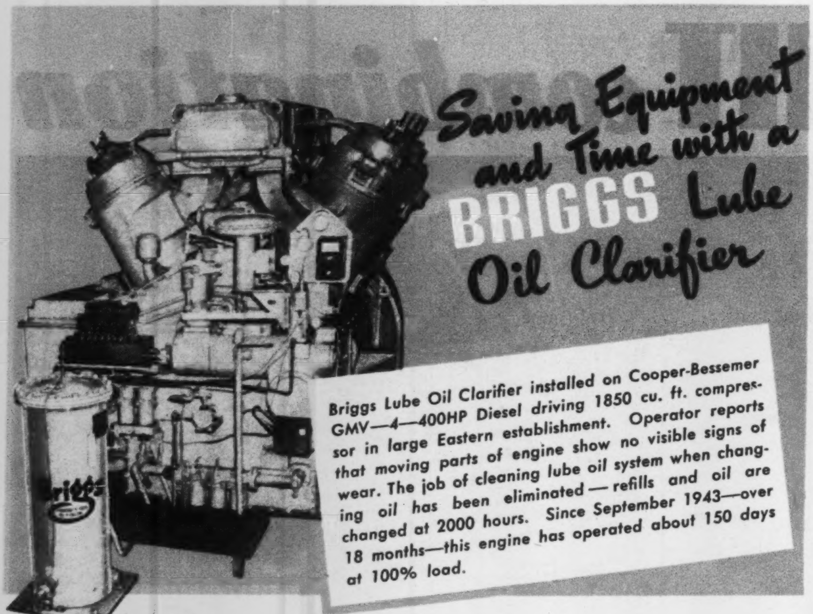

Briggs Lube Oil Clarifier installed on Cooper-Bessemer GMV—4—400HP Diesel driving 1850 cu. ft. compressor in large Eastern establishment. Operator reports that moving parts of engine show no visible signs of wear. The job of cleaning lube oil system when changing oil has been eliminated — refills and oil are changed at 2000 hours. Since September 1943—over 18 months—this engine has operated about 150 days at 100% load.

ARMY E NAVY

Wherever you have a Diesel-driven compressor that MUST stay on the job—THERE'S THE PLACE TO INSTALL A BRIGGS OIL CLARIFIER! In addition to dependability—you'll secure savings in lube and fuel oil—savings in maintenance—savings in lost man-hours—longer life for your equipment.

Briggs Oil Clarifiers are available for every size and type internal combustion engine and for all other applications where filtration of oil is essential.

The Briggs distributor nearest you will give you astounding facts—backed up by proof. He's listed in the "Filter" section of your classified telephone directory. Call him—or write to manufacturer for informative literature on the Briggs method of oil filtration.

ONLY BRIGGS

FULLERS EARTH TYPE CARTRIDGES clean oil 3 times—3 ways, keep oil "refinery-pure."

BRIGGS DISCEL (All-Cellulose Type) cartridges are designed and manufactured for effective filtration of additive-type oils.

Briggs

PIONEERS IN MODERN OIL FILTRATION

BRIGGS CLARIFIER COMPANY
General Offices: Washington 7, D. C.

"GUNITE" CONCRETE

For ● Steel Plate Lining ● Steel Encasement ● Building Walls, Roofs, Facings ● Tunnel Lining ● Water Reservoir Lining ● Power Plants — Bunker Lining ● Sewer Repairs ● Tank Lining ● Canal and Ditch Lining ● Repairs of Disintegrated Concrete, Brick, Tile, Masonry

● ● *WRITE* ● ● ● *PHONE* ● ● ● *WIRE* ● ●

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1301 WOODSWETHER ROAD ● KANSAS CITY, 6, MISSOURI
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Nineteen years ago he was statione at Miami Beach where he has bee supervising river and harbor and civ works in a territory extending fro Melbourne to Key West. Recently h has supervised much military constru tion in southeast Florida.

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Howard D. Herbst is city engineer of Steubenville, Ohio, succeeding James K. McGinnis, who died Jan. 12. Mr. Herbst had served as assistant city engineer since 1923. He is a graduate of the University of Michigan's school of engineering.

N. C. Hubbs, Marion County engineer at Salem, Ore., for the last 10 years has resigned.

Herman Ahlvers has been appointed Clallam County engineer at Port Angeles, Wash., to succeed Theodore F. Rixon, a pioneer civil engineer of western Washington who resigned recently at the age of 84. Mr. Ahlvers formerly supervised one of the county's road districts.

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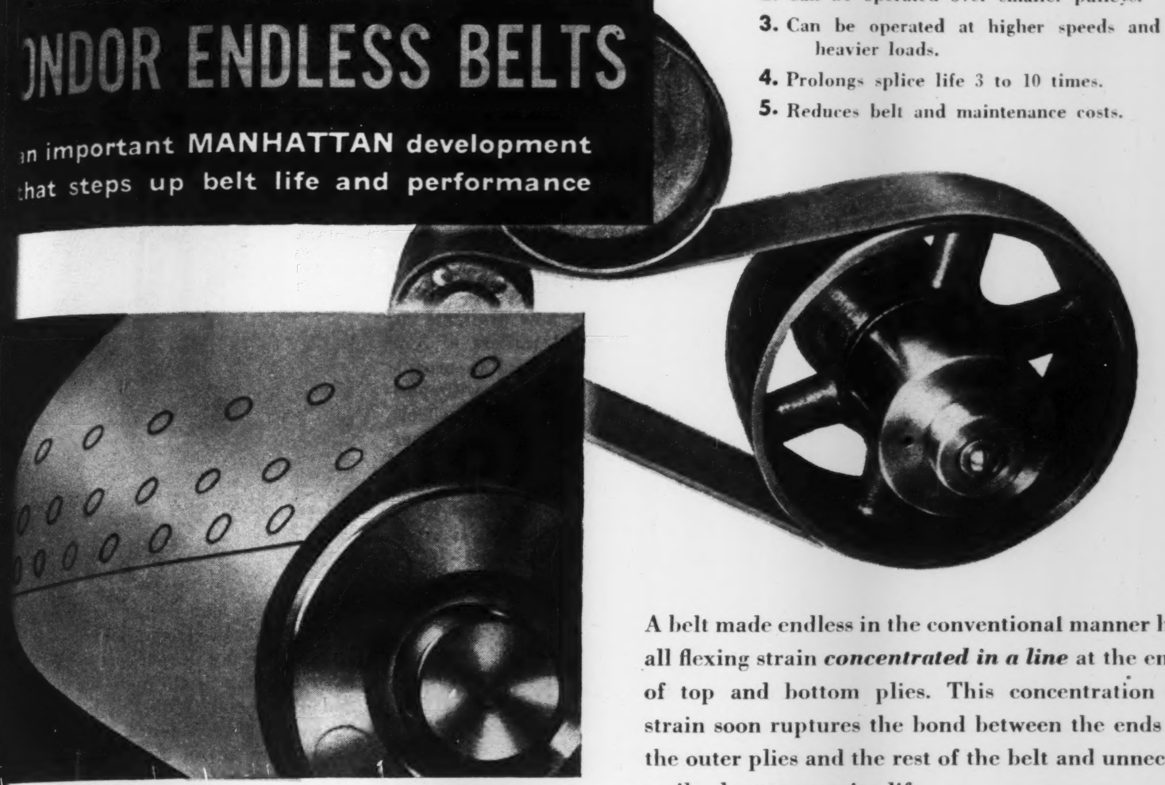
Capt. George C. Pyne, Jr., of Durham, N. C., has returned to the United States under the Army's rotation plan after having served with the Army Corps of Engineers overseas for 30 months. He served in North Africa, Sicily, Italy and France. A graduate in engineering from Virginia Polytechnic Institute, he was associated with the engineering firm of Atwood and Weeks at Durham prior to entering the service. He is now awaiting reassignment.

Extensible-Tip in CONDOR ENDLESS BELTS

an important **MANHATTAN** development that steps up belt life and performance

ADVANTAGES

1. Increases flexibility at splice.
2. Can be operated over smaller pulleys.
3. Can be operated at higher speeds and heavier loads.
4. Prolongs splice life 3 to 10 times.
5. Reduces belt and maintenance costs.



All warp threads in outer plies are cut by suitably spaced perforations filled with "live" FLEXLASTICS, which are then vulcanized to become "elastic rivets." These stretch and relax progressively (see illustration) as they pass over the arc of contact, providing stress relief for every warp thread, permitting use of smaller pulleys on short-center drives and higher speeds.

Above: Ordinary type of splice which failed when ply end gave way. **Below:** A splice with EXTENSIBLE-TIP, still unbroken after running 10 times as long under identical conditions. This increased life is due to ***extended-area stress relief.***

A belt made endless in the conventional manner has all flexing strain ***concentrated in a line*** at the ends of top and bottom plies. This concentration of strain soon ruptures the bond between the ends of the outer plies and the rest of the belt and unnecessarily shortens service life.

MANHATTAN'S EXTENSIBLE-TIP—an exclusive, patented Strength Member development—provides multiple stress relief, uniformly ***distributed over an area*** of the belt where the duck ends. In addition, the end is welded to the adjacent ply by "elastic rivets" made from special FLEXLASTICS.

It is this extended area of stress relief that makes the Extensible-Tip last as long as the belt, lets you run the belt at higher speeds, over smaller pulleys, on short-center drives, and increases its service life from three to ten times over ordinary methods of making the same belt endless.

You protect the continuity of your production when you use MANHATTAN Endless Belts, all of which are made with the ***extended-area stress relief*** provided by the MANHATTAN EXTENSIBLE-TIP.

The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS. Condor Belts are now made in the dark, war-time color.

RM

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES AND FACTORIES **PASSAIC, NEW JERSEY**

NAVY

Saving Equipment and Time with a BRIGGS Lube Oil Clarifier
Briggs

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For • Steel Plate Lining • Steel Encasement • Building Walls, Roofs, Facings • Tunnel Lining • Water Reservoir Lining • Power Plants — Bunker Lining • Sewer Repairs • Tank Lining • Canal and Ditch Lining • Repairs of Disintegrated Concrete, Brick, Tile, Masonry

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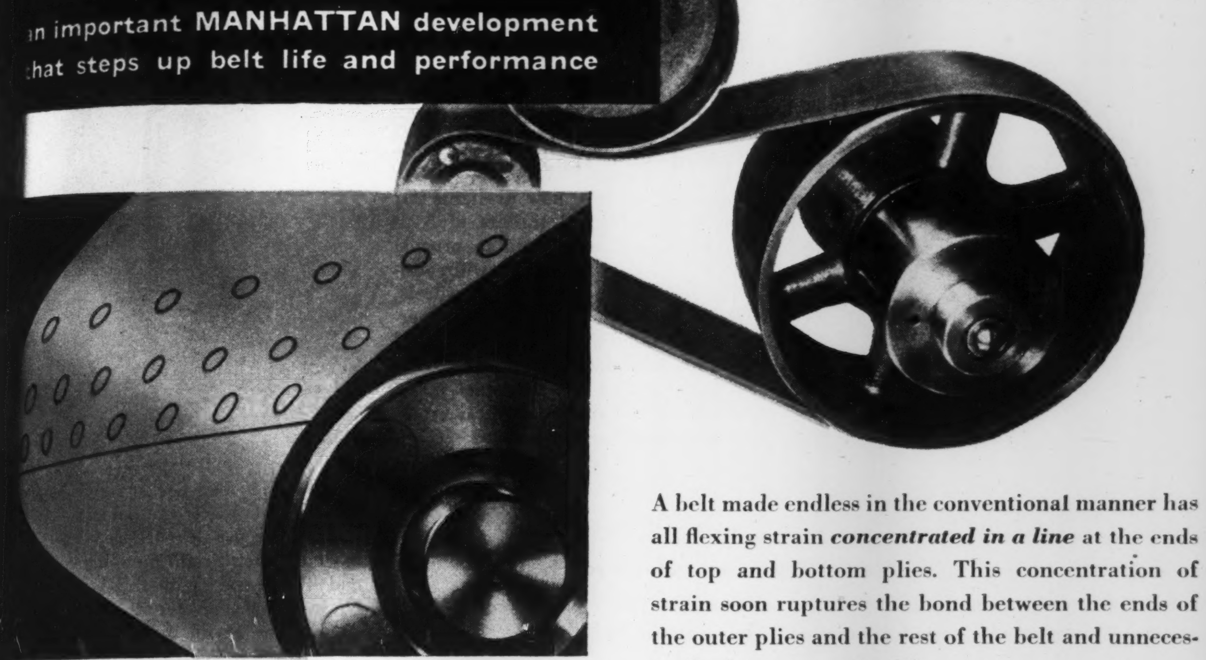

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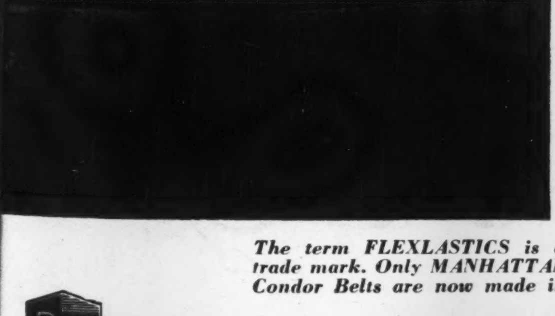

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THE MANHATTAN RUBBER MFG. DIVISION

OF RAYBESTOS-MANHATTAN, INC.

EXECUTIVE OFFICES AND FACTORIES PASSAIC, NEW JERSEY

New Aids to the Constructor

Sweeping Magnet

For use inside or outside of factories, parking lots, etc., a new sweeping magnet removes the danger of destruction of tires by scraps of metal. An 18-in. drum has a permanently magnetized working face, mounted on a chassis much the same as a lawn mower. Scrap is picked up and deposited in a tray back of the drum.

The magnet's handle allows for pulling or pushing the machine.—*Stearns Magnetic Mfg. Co., Milwaukee 4, Wis.*

• • •

Hydraulic Trailer Brake

Hydraulic brakes, now available for heavy duty industrial trailers of 5 to 100 tons capacity, are said to provide smooth, fast braking action, with positive, equal brake pressure on all wheels.

The brakes will not drag when operating over rough terrain, and unlimited oscillation of tandem axles will not effect brake action. Maintenance is reduced to a minimum because brake rods, pins and cables are eliminated.—*C. R. Jahn Company, 1341 West 37th Place, Chicago, Ill.*

• • •

Electrode Holder

Designed for unobstructed visibility while welding and maximum accessibility, even for deep pocket work, the new "Shortstub" electrode holder also increases the usable portion of the electrode to a point right up to the uncoated end of the rod. With this holder, only ½ in. is needed for a tight, efficient current contact in the holder jaw. The

DIXON'S TYPHONITE ELDORADO-- 3H

"I'M GOING NUTS!" I HOWLED

These pencils are as uniform as a handful of pebbles!

Take it easy, Bill. Get yourself the right pencils—Typhonite Eldorado. They're honeys! Their leads are dependably true in every degree. The points stand up under pressure, too.

And draw? Boy! Eldorado will give you beautiful lines—dense, clean, sharp and brilliant. Eldorados are made by specialists who know what a draftsman wants. There's a free Comparison Sample waiting for you, Bill—and for all draftsmen who send the coupon below.

DIXON'S TYPHONITE
ELDORADO

Pencil Sales Dept. 227-J4
Joseph Dixon Crucible Co.
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Gentlemen: Please send me a free Comparison Sample of Typhonite Eldorado drawing pencil.......degree.

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Jim—
Better look
at a HAISS
Our loading
costs are
shameful
HAISS

For All-Around Service,
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3 yds. per min.

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For Big Capacity,
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hen you get right down to cases, and *loading cost per yard* is the measuring stick—the Haiss Loader is not high priced at all. It never tried to be a cheap piece of machinery. Its purpose has always been to satisfy the many who wanted the one which would save money in the long run . . . That's why Haiss puts a big, husky gearset into it. One that's engineered for Loader service—with the clutches as well as gears running in oil . . . That's why so much design attention is paid to making the Haiss a machine that *costs least* to maintain . . . You *can't* afford to buy without investigating Haiss first.

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  Indianapolis—Reid-Holcomb Company
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  New York—Air Compressor Rental and Sales
  Olean—Freeborn Equipment Company
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  Oil City—Freeborn Equipment Company
  Philadelphia—Metalweld, Inc.
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SOUTH CAROLINA
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TENNESSEE
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TEXAS—Dallas—Shaw Equipment Company
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WEST VIRGINIA
  Fairmont—Interstate Eng. & Constructors
WYOMING
  Cheyenne—Wilson Equipment & Supply Co.

Get more WORTH from air with WORTHINGTON

Buy Blue Brutes

Worthington Pump and Machinery Corp.

"Shortstub" holder is completely insulated; it loads and unloads quickly. Its perfect balance and light weight are said to minimize operator fatigue.—*Hollup Corp., division of National Cylinder Gas Co., 205 West Wacker Drive, Chicago 6, Ill.*

• • •

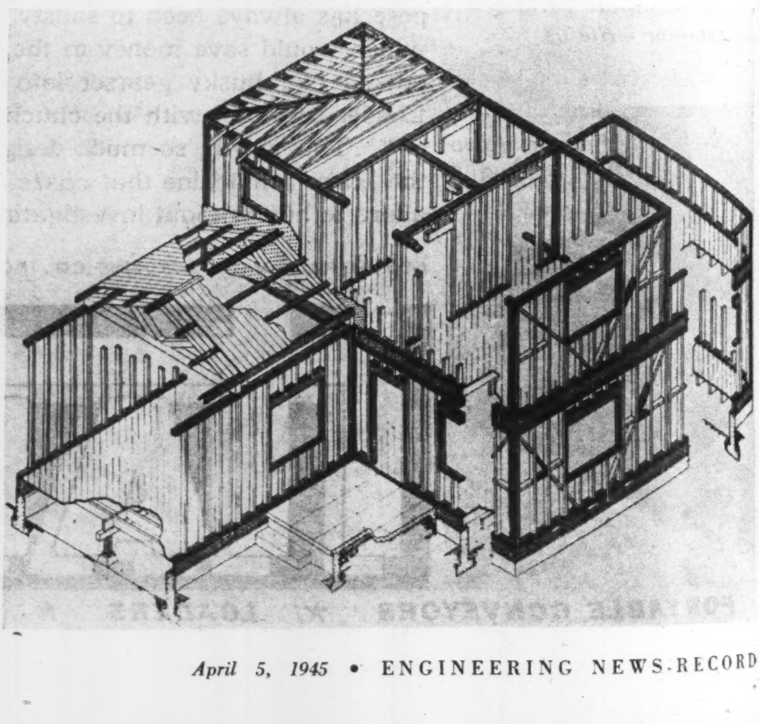
Leak Stopper

Prepared especially to stop water leaks through concrete, a new material, Seep-Seal, may also be used for dampproofing walls. Mixed with cement, Seep-Seal can be inserted in cracks or holes while water is actually gushing through, it is claimed, and will stop the leak in 2 minutes.—*Rock-Tred Corp., 629 W. Washington St., Chicago 6, Ill.*

• • •

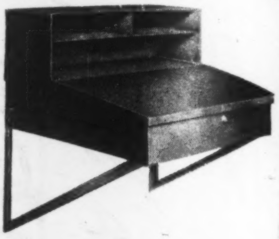
Framing for Termite Control

A new invention to safeguard wood buildings against dry rot fungi and termites for only 2 percent of the total cost of the structure is illustrated in the framing detail drawing. Its purpose is to use pressure-treated lumber at those points in the structure most vulnerable to attack and at the same time to place this lumber in such strategic positions that any infestation that might occur in other parts will be isolated and confined to a small area that can be replaced with a minimum of labor and cost. Any approved pressure treated lumber can be used provided it is treated with 8 lb. of Grade 1 American Wood Preserver's Association standard creosote or approved equal.—*Hollywood Termitrol Company, Inc., Los Angeles, Cal.*



Steel Wall Desk

Especially suitable for checkers timekeepers and inspectors, a steel wall desk, Model 2131-17, measuring



24⅝x23½x13 in., may be easily attached to any convenient wall space, building column or rack. This desk has a large working surface and storage compartment, as well as three open compartments across the back.

Finished in Lyon green baked enamel, this desk comes complete with pencil trays, a grooved lock with two keys, and an angle steel supporting bracket.—*Lyon Metal Products, Inc., Aurora, Ill.*

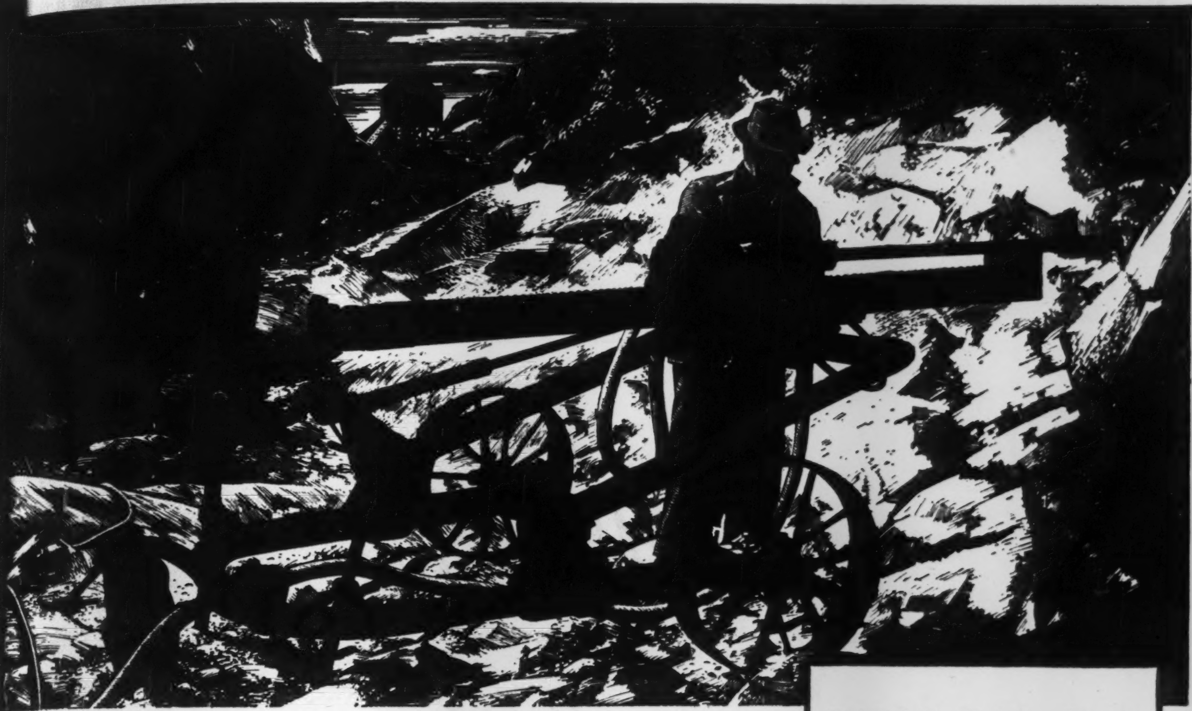
• • •

Earthmover

Possessing great flexibility of travel over rough, rocky or uneven surfaces, the new Terra-Cobra self-propelled earthmover is designed for high speed. Many new features are embodied, among them positive two-wheel hydraulic steering, which maintains a fixed direction of travel over all types of ground and at all speeds. Both drive wheels turn at the same time under full traction and power, by means of a single steering bar.

The Terra-Cobra, powered by a

A NEW BLUE BRUTE FOR NEW ROCK-BUSTING JOBS



Enough crushed rock for today's needs plus those of the postwar future (like Pennsylvania's $500,000,000 Postwar Highway Program, for example) is an order that will take plenty of top-rate drilling.

Already Worthington's improved UMW Wagon Mounting with its 4" WD-40 Drifter is keeping quarries hot with its speedy, powerful, easy drilling. It's the wagon mounting you'll want for your new jobs — and, like other Blue Brute products, it's available today.

This UMW-40 is the most versatile machine in the business. Drills holes in any direction and at any angle. U-arm may be swung in any position from vertical to 45° below horizontal. Two rear wheels may be turned through 90°, thus permitting line drilling close to a face. 6-foot nominal steel change.

Its many other advantages — plus the savings in maintenance cost you get with portable Blue Brute Compressors — the ones with the famous easy-breathing Feather* Valves — mean more air per compressed air dollar and more holes drilled per day.

Investigate Blue Brutes. Try 'em—buy 'em. Nearest distributor listed on p. 236.

Behind the Fighting Fronts with

BLUE BRUTES

In today's mechanized warfare, Blue Brutes** help prepare the way — repair bridges, roads, tunnels, set up fighting positions, build landing fields. At home, in Army Camps, Navy bases, Blue Brutes are at work. They'll be ready, postwar, for the construction projects now being planned for peacetime jobs and improvements.

---

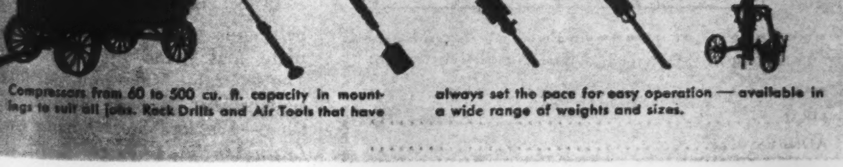
*Reg. U.S. Pat. Off.

**Blue Brute Compressors and Air Tools are painted olive-drab for the Army and battleship-gray for the Navy.

Get more WORTH from air with WORTHINGTON

BUY BLUE BRUTES

24H-5-2



Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

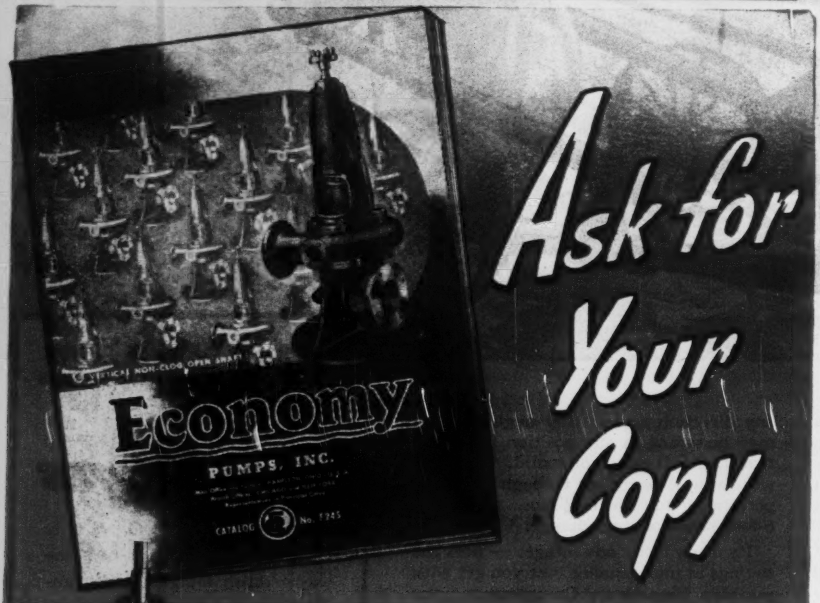
WORTH BEHIND THE NAME WORTHINGTON

Worthington Pump and Machinery Corporation, Construction Equipment Department, Holyoke, Massachusetts

LA CROSSE
MACHINERY
TRAILERS

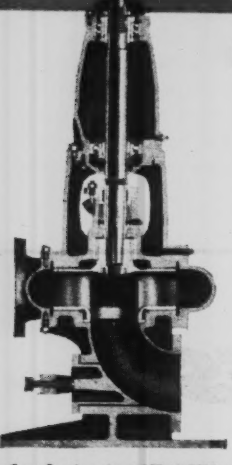
— Built by —

LA CROSSE TRAILER & EQUIPMENT CO.
LA CROSSE, WISCONSIN



Featuring the Newest Designs...
Complete Selection Tables of
VERTICAL NON-CLOG PUMPS!

Here's your answer to the problem of pumping liquids containing solids, etc. Catalog F-245 fresh off the press presents the last word in Non-Clog construction—backed by over 30 years specialized experience, precision manufacture and modern production practice. Selection tables simplify the choice of exact types and sizes to handle your requirements. A copy of the Catalog is yours for the asking. So are the services of our engineering staff.



Cross Section view of Type SSV Pump showing Adjusting Nut for taking up Impeller wear, Bronze Renewable Shock Absorber and other exclusive features described in Cat. F-245.

NOTE: There still are some valuable territories not under sales contract. Write for information on sales plan and distribution of Economy Pumps.

ECONOMY
PUMPS, INC.
HAMILTON, OHIO

Send Economy Cat. F-245 without obligation to:
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heavy duty diesel engine with fo speeds forward, and a reverse, can tra up to 20 mph. on short or long stretche A universal oscillating king pi coupling the prime mover to the scrape

gives flexibility and eliminates the dan-ger of one unit tipping the other. Othe features are the air-operated non-jerky, non-slipping cable hoist and the power-ful air brakes which apply braking power on the rear of the scraper and equally on both wheels at the same time. —*Wooldridge Mfg. Co., Sunnyvale, Calif.*

• • •

Pillow Block Bearing

Designed to give 30,000 hours or more of service under conditions for which it is adapted, a new Dodge-Timken Type "E" bearing is now available in both pillow blocks and flanged units.

The method of fastening to shaft is simple and effective. On each end of the extended inner race is a steel collar having two headless set screws spaced 120 deg. apart, extending through clearance holes in the inner race to the shaft; these screws provide a positive lock. Housings are compact and rugged and are precision machined to close tolerances on automatic machines. Effective labyrinth seals prevent loss of lubricant and protect bearings against damage from dust, dirt or moisture, whether the bearing is on or off the shaft.—*Dodge Mfg. Corp., Mishawaka, Ind.*

• • •

V-Belt Fastener

A new separable hinged V-belt fastener has widely extended the use of A and B section V-belts, the manufacturer states. This "Flex-V" fastener consists of two V-shaped end plates, an alloy metal hinge pin and self-tapping screws.

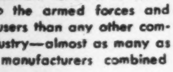
A simple applicator prepares the belt ends, places and aligns the end plate and holds the screws upright. The separable hinge joint permits quick replacement of belts without dismantling.—*Flexible Steel Lacing Co.,* 4607 *Lexington St., Chicago* 44, *Ill.*

SPOTTING THE MARK

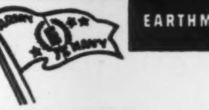
That Means LOWEST POSSIBLE COST

PER YARD . . . PER TON . . . PER ACRE !

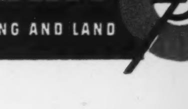
When the time comes to buy new equipment for tomorrow's earthmoving and land clearing jobs, it will pay you to remember the mark LPC, as your guide to lowest possible cost. For LPC stands for LaPlant-Choate—the *job-proved* line of tractor equipment that's known and respected the world over for its outstanding performance on *thousands* of tough jobs. Designed and built by "specialists" with over *34 years* of practical "know-how," LaPlant-Choate equipment will continue to be a step ahead in improvements that assure *lowest possible cost per dollar invested.* LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.



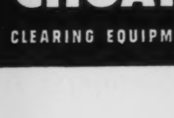
ALL TYPES OF DOZERS*— Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.



LARGE OR SMALL SCRAPERS — Hydraulic or cable operated, front or rear dump, for use with wheel or track-type tractors.



CABLE OPERATED RIPPERS— For ripping up hard ground, shale or concrete to facilitate loading with "Carrimor" Scrapers.

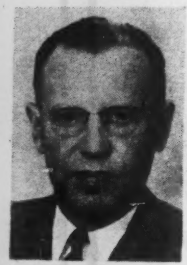


LAND CLEARING TOOLS— A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all interchangeable.

LAPLANT CHOATE
EARTHMOVING AND LAND CLEARING EQUIPMENT

* Again in '44, LaPlant-Choate delivered more dozers to the armed forces and other essential users than any other company in the industry—almost as many as all the other manufacturers combined

Manufacturers' Activities



Appointment of Walter F. Myers to the Washington office of The Cooper Bessemer Corp. has been announced. Mr. Myers has served during the last 25 years as sales, construction, and consulting engineer for the Fairbanks Morse Co., the Federal Power Commission and the United States Maritime Commission.

Mr. Myers will assist Charles G. Cooper, director of the Washington office, in the handling and supervision of government contracts and sales and service in the South Atlantic states.

Appointment of Willard Walker, vice-president of Mack-International Motor Truck Corp., as manager of the Greater New York Division has been announced by C. T. Ruhf, president of Mack Trucks, Inc. For the past five years Mr. Walker has been head of Mack's Government department.

Douglas S. Laidlaw, formerly with Defense Industries Limited at the Bouchard Works in Quebec, has joined the aircraft division of Canadian Car and Foundry Co. as assistant plant engineer at the Fort William plant. Mr. Laidlaw is a graduate civil engineer of the University of Toronto and has been a structural engineer in Toronto.

Lucien W. Moore, general purchasing agent of Crane Co., has been appointed manager of the valve and fitting sales department, with headquarters at the Crane offices in Chicago. He is succeeded as purchasing agent by Thomas J. Hanlon.

Lima Locomotive Works, shovel and crane division, Lima, Ohio, announces the appointment of Rupp Equipment Co., Buffalo, N. Y., as distributor for Lima shovels, cranes and draglines in western New York.

Inland Steel Co., Chicago, has announced the establishment of an Indianapolis, Ind., district sales office and the appointment of Norbert E. Smith a district sales manager. The office wi be in Suite 831-3, Architects & Builder Building, 333 N. Pennsylvania Street Mr. Smith has covered Indiana representing the Chicago office since 1936 Prior to his Inland affiliation, he covered Indiana for Joseph T. Ryerson & Son, Inc., an Inland subsidiary. He started with Ryerson in 1922.

The Appointment of R. E. Sprenkle as hydraulic engineer of Bailey Meter Co., Cleveland, Ohio, has been announced. He will act as consultant and supervise research on fluid flow. He will also cooperate with civil and sanitary engineers in working out the problems of metering and control equipment in the design of water supply and sewage treatment plants.

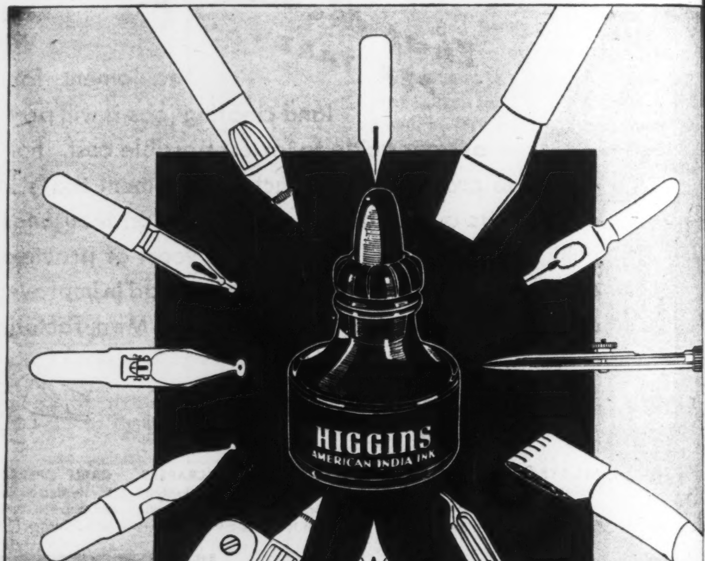
Mr. Sprenkle has been associated with Bailey for over 20 years during which he has conducted investigations in the hydraulic laboratories of numerous engineering schools, has served for many years as a member of the A.S.M.E. research committee on fluid meters, and

ALL PENS POINT TO HIGGINS

Character in your lettering depends upon the character of the combination you choose; the **pen** and the **ink.** The accuracy of your finished job depends upon your choice of the ink that gives you complete control.

There's no "wheel of chance" when you use Higgins American Drawing Ink. With it you have complete freedom and facility with any type of pen or brush, precise performance that adds that intangible "something" achieved by all great artists and draftsmen — quality.

HIGGINS — the outstanding favorite of professionals and students for over 60 years!



HIGGINS *INK CO., INC.*
271 NINTH ST., BROOKLYN 15, N. Y.

ellows..

do many metal cutting jobs faster — more economically

Need a couple of six foot circles of 1" plate, a few three inch washers? Want to split up a big steel plate and bevel the edges for welding or cut up some structural shapes?

An Airco Radiagraph — one of Airco's small portable gas cutting machines — will do any of these jobs — and many more — and do them faster and more economically.

Operating on steel tracks furnished for five foot cuts, they will make straight cuts of unlimited length in one continuous operation when tracks are progressively positioned.

With an adjustable radius rod and center point, they will cut circles from steel plate of any thickness in a wide range of diameters.

With a side roller attachment and template shaped to guide the machine, long, sweeping curves may be cut.

The torches are adjustable to permit a perpendicular cut or one of any desired bevel. A second torch can be mounted on the machine for the cutting of two parallel straight lines with double bevel or two concentric circles simultaneously. A third torch can also be mounted on the machine for simultaneously cutting a double bevel with land to prepare plate edges for welding.

A conveniently-located indexed speed control permits the operator to increase or decrease the speed of the machine at will.

Airco Radiagraphs are made in two models, the No. 10 (weight 41 pounds with torch) and the No. 4 (weight 74 pounds with torch). Each machine is available in several speed ranges within the limitations of 2" per minute minimum and 50" maximum for the No. 10's and a minimum of 1½" per minute and a maximum of 75" per minute on the No. 4's. Both models are sturdily-built and dependable.

● For copies of folders containing full details on these two gas cutting machines, ask your nearest Airco office or write Dept. EN. Air Reduction, General Offices: 60 East 42nd Street, New York 17, N. Y. In Texas, Magnolia Airco Gas Products Co., General Offices: Houston 1, Texas.

AIR REDUCTION

OFFICES IN ALL PRINCIPAL CITIES

AIRCO

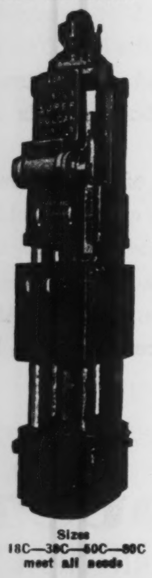
Cutting Machines

[illegible] SPEED [illegible] ACCURACY [illegible] FLEXIBILITY [illegible]

SUPER IN PILE DRIVING RESULTS

SUPER-VULCAN OPEN TYPE DIFFERENTIAL-ACTING PILE HAMMERS 18C, 30C, 50C and 80C

• Get those piles down in the fastest time with least effort and with savings in cost. Twice the blows per minute does the job and there's greater penetration. Each blow takes but one quarter to one third less the usual steam requirements. Things to consider are the rugged strength, positive action, and compactness. The open type fits the same leads and uses the same accessories as the VULCAN single-acting Pile Hammers.



Sizes
18C—30C—50C—80C
meet all needs

VULCAN IRON WORKS
Since 1852
331 North Bell Avenue
Chicago 12 - - - Illinois

has had a wide experience in the practical application of industrial metering equipment.

THE JAEGER MACHINE CO., Columbus, Ohio, is establishing regional headquarters in New York City, Chicago and Birmingham, Ala., to serve the eastern, midwest and southern territories. As eastern regional manager, L. T. Phillips will direct sales and service for Jaeger construction, paving and industrial equipment in New England and Atlantic coast states as far south as North Carolina. Branch offices are being established at Baltimore, Philadelphia and Richmond. The Chicago area, in charge of V. G. Mandt, will serve Illinois and western Michigan to Kansas, Nebraska and the Dakotas with branches at St. Louis and Minneapolis. The area from Tennessee south to the Gulf and west to Arkansas will be served from Birmingham headquarters where E. G. Mandt has been appointed regional manager.

ADVANCEMENT of Merwin T. Farley to supervisor of the parts depot of Caterpillar Tractor Co., Peoria, Ill., has been announced. Mr. Farley will devote his time to the supervision and future development of the parts depot department.

S. Howard Evans and Louis Levenson have announced the formation of the Evans Machinery and Equipment Co. at 770 So. Schuylkill Ave. Philadelphia 46, Pa. to distribute the products of Four Wheel Drive Auto Co., Contractors Machinery Co., Inc., Wm. Bros Boiler & Mfg. Co., E. D. Etnyre & Co., and other road equipment lines.

P. J. DEGNON, vice-president of Mack Motor Truck Co., has been appointed manager of the New England division in Boston. He started with the Mack Co. in 1919 as branch manager at Atlanta, Ga., following service as a first lieutenant in motor transport during the last war. He later was named manager of the southern division and in 1925 was appointed vice-president in charge of sales and service in the south. In 1933 he was transferred to New York and managed the metropolitan area until his present appointment. In New England he replaces W. A. Maynard, who is retiring after 25 years of service.

FAYETTE LEISTER has been appointed engineering manager of the Fafnir Bearing Co., New Britain, Conn. He will coordinate product design and development, quality standards, testing and research, engineering, and data and service engineering. He has been with Fafnir 25 years, since 1935 in charge of the Detroit territory.

WALTER W. PATNOE, Cleveland, Ohi chief engineer of Basic Refractorie Inc., has been named acting manag of operations, succeeding the la Charles G. Adams. Mr. Patnoe al will continue as manager of enginee ing with offices in Cleveland.

The election of Barton W. Brucke miller to succeed John A. Miller as director and president of the Pennsy vania-Dixie Cement Corp., New Yor has been announced. Mr. Miller r signed recently following the forty-fift anniversary of his entry into the cemen business. Mr. Dunkenmiller entered th industry in 1913 and has been wit Pennsylvania-Dixie during ten of th intervening thirty-two years. He ha been general sales manager and vice president of the corporation since Jan 1, 1939, and Feb. 17, 1942, respectively

THE APPOINTMENT of W. W. Paape as sales representative of the Euclid Road Machinery Co., has been announced.

Mr. Paape has been active in the construction equipment industry for 20 years. Prior to joining Euclid he was sales manager of Syracuse Supply Co. and before that formerly served as representative for Caterpillar Tractor Co. and LaPlant Choate Mfg. Co.

At present he is making his headquarters at the main offices of the company in Cleveland and is temporarily assigned to the territory including Ohio and adjacent states.

APPOINTMENT of Eric W. Hammarstrom as assistant to the vice-president in charge of sales of The Philip Carey Manufacturing Co., Cincinnati, Ohio, has been announced. Mr. Hammarstrom has been associated with the building materials division of the War Production Board in Washington, responsible for asphalt roofing and other major building material items. He is a graduate of Columbia University and has been connected with the building materials industry since 1930. He will be general assistant to E. W. Smith, vice-president in charge of sales.

A NEW roofing company, Tamko, has begun operation in Joplin, Mo., with plans for full production by the first of the year. A building has been completely reconstructed to accommodate modern equipment for the manufacture of asphalt roofing. With a floor space of 35,000 sq. ft., and a capacity of seven or eight carloads per day, Tamko

KUE-KEN*

BALANCED CRUSHERS

IVE YOU THESE ADVANTAGES

arge reduction ratio that makes a prod- usually requiring two or more ordinary shers plus screens, elevators, etc.

erfect balance cancels these internal tructive forces present in all other shers, and permits mounting anywhere n skids—on tall bins—or on any type ortable plant.

Up to 10 times the jaw plate wear is obtained with the exclusive KUE-KEN principle of *crushing without abrasion.*

Great capacity—little power. Users report crushing faster and finer, using only one-sixth the power formerly required per ton crushed. Really low cost crushing.

ow bearing pressures, with per- t pump and splash lubrication in ustite case practically eliminate aring troubles. (Cool running h a light SAE #30 oil tells how the bearing pressures really).

imple, *positive safety* device tects crusher against overload d tramp iron. No shearing or eaking parts that let go at the ong time.

utomatic pressure switch that uts down crusher if oil pressure below standard. No operator eded to watch.

aw opening can be changed ickly to regulate the product e.

UE-KEN crushers available in o 50 tons per hour capacity at the esent time. Larger ones soon.

Write for bulletin 602 for full de- ls of these really modern crush- s.

ounced Q-KEN

TRAUB MANUFACTURING CO.

573 Chestnut Street
Oakland 7, California

Ken Balanced Crushers • Rib Cone Ball Mills • Screen Wheel Classifiers • Overhead Eccentric Crushers • Feeders • Kueneman Gyracones • Concentrating Tables • Spiral Classifiers • Standard or Sectionalized

it's the TOPS!

500 Ft. Stack,
Tallest East of
the Mississippi
MADE WITH
SAUEREISEN
No. 31
ACID-PROOF
CEMENT

RIVALS HEIGHT OF WASHINGTON MONUMENT!

Washington Monument, the World's largest stone and masonry structure, towers 550 feet into the sky. The stack, pictured here, was recently erected in Pennsylvania. It is 500 feet high and was lined with acid-proof brick, laid in Sauereisen No. 31 Acid-Proof Cement. Over 480,000 lbs. of Sauereisen Acid-Proof Cement No. 31 were used on this job.

USED ON BIGGEST JOBS

This is just an example of hundreds of case histories in our files that demonstrate the satisfaction large users obtain from this superior acid-proof cement. Thousands of tons are now in place on masonry constructed tanks, towers, vats, pits, floors, filters, and receivers.

QUICK SETTING— GREATEST STRENGTH

Sauereisen No. 31 Acid-Proof Cement hardens rapidly but remains soft and pliable enough to permit ample time for handling. It is ready to use by simply mixing a powder and liquid. Applies like ordinary mortar. It is the strongest sodium silicate cement available for acid-proofing. A trial order must convince or there will be no charge.

SAUEREISEN CEMENTS CO.
Sharpsburg Sta., Pittsburgh, Pa.

MANUFACTURERS OF
INSA-LUTE
(Liquid Porcelain)

Prove it yourself!
ORDER A TRIAL BAG

SAUEREISEN CEMENTS COMPANY
Pittsburgh 15, Pennsylvania
Gentlemen:
Ship a trial 100 lb. bag of Sauereisen No. 31 Acid-Proof Cement at $12.00.

Name..
Street..
City.......................... State..................
Date.......................... By.....................

expects to contribute largely toward meeting the roofing demands of the post war era.

Lukens Steel Co. has been licensed by the Carnegie-Illinois Steel Co. to manufacture "Cor-Ten", a corrosion-resisting, high strength, low alloy steel. Heretofore the product has been produced solely by subsidiaries of U. S. Steel Corp. It has been extensively used to reduce weight in mobile equipment and also in bridges and other structures.

William M. Bager, former vice president in charge of engineering and sales for the Bucyrus-Erie Co., South Milwaukee, Wis., and technical adviser, died recently at Christian Pass, Miss. He was graduated from the Royal Institute of Technology at Stockholm, came to America in 1900 and took a job as a drill press operator. Later he went into the engineering department.

The Superior Engine division of the National Supply Co., with factory at Springfield, Ohio, and executive offices at Pittsburgh, Pa., has opened an office at Ames, Ia., to serve the midwest area. C. B. Sherman, formerly of Mason City, Ia., is the district manager at the Ames office.

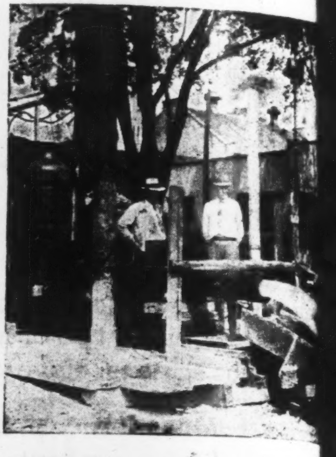
Iron and Steel Products, Inc., dealers in rebuilt and second hand railroad and contractors' equipment car parts and machinery, announce the appointment of David Newhall as vice president in charge of the New York district.

Reginald F. Hayes, since 1936 in charge of sales in New England for the Hydraulic Development Corp., West Medford, Mass., and connected with that company since 1928, has been appointed general sales manager at 50 Church St., New York, N. Y.

H. B. Higgins, president of the Pittsburgh Plate Glass Co., has announced plans for a $700,000 addition to production facilities at its Mt. Vernon, Ohio, window glass plant, in line with its expansion program.

Vacuum Concrete, Inc., Philadelphia, Pa., has received an order from the Soviet government for 20 vacuum concrete pilot plants. This is for speeding up construction for war purposes and for reconstruction.

Pittsburgh Corning Corp. will double the capacity of its foamglas plant at Port Allegany, Pa., to meet increasing demands for cellular glass insulation, a material first put into commercial production less than two years ago. Ad-



"Good Makings"
Make a Good Water Syste

You can always put your utmost confiden in a Layne Well Water System. Everythi from the method used in drilling and fi ishing the well to the design, manufactu and installation of the pump can be trust for highest efficiency, most durable quali and the longest life of service.

Shown above is a system recently co pleted for a major food manufacturer. Ru ning true to Layne form, this system e performs its guarantee, producing near twice as much water as other wells in th same locality. This manufacturer knew wh to expect. He already owns four other Lay Well Water Systems, all of which hav always given outstanding service. He kno how little it costs to operate Layne System how much water these systems produce an how small the upkeep cost.

Layne is already in postwar work. Man postwar installations are now being mad Others will soon be started. All will be the world famous Layne quality.

If you need more water, either from en tirely new wells and pumps, or from effi ciently modernized old ones, write, wire phone for the planning and estimating serv ices of a Layne engineer. No obligatio Address Layne & Bowler, Inc., Gener Offices, Memphis 8, Tenn.

***LAYNE PUMPS** —fulfill every need for producing large quantities of water at low cost from wells, streams, mines or reservoirs. Send for literature.*

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. ★ Layne-Atlantic Co., Norfolk, Va. ★ Layne-Central Co., Memphis, Tenn. ★ Layne-Northern Co., Mishawaka, Ind. ★ Layne-Louisiana Co., Lake Charles, La. ★ Louisiana Well Co., Monroe, La. ★ Layne-New York Co., New York City ★ Layne-Northwest Co., Milwaukee, Wis. ★ Layne-Ohio Co., Columbus, Ohio ★ Layne-Texas Co., Houston, Texas ★ Layne-Western Co., Kansas City, Mo. ★ Layne-Western Co. of Minnesota, Minneapolis, Minn. ★ International Water Supply Ltd., London, Ontario, Canada ★ Layne-Hispano Americana, S. A., Mexico, D. F.

LAYNE

WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

Preformed wire rope

CUTS PRODUCTION COSTS 3 WAYS

One reason is enough—but here are *three* reasons why Preformed wire rope cuts production costs:

1. Preformed lasts longer; pays bigger dividends on wire rope dollars.
2. Preformed rotates less. You don't have to repair or replace sheaves, drums and rope so often.
3. Preformed winds easily on drums. You encounter fewer delays. Your men and machines produce more per day, per month, per year.

Thousands of operators have standardized on Preformed—and use nothing else on tough wire rope jobs.

ASK YOUR OWN SUPPLIER FOR PREFORMED WIRE ROPE

Leading Load Carrier on Leyte

From LST to GMC is the word of the day in this supply scene from the Leyte Beach. Acme Newsphoto.

GMC Has Built More than 475,000 Like It!

The conquest of Leyte, accomplished in but 68 days, is a splendid tribute to the courage and efficiency of American fighting forces, not only on battle lines, but on supply lines as well. The photograph above tells part of the story of the gigantic job of supply. An even better understanding is provided by War Department estimates that overseas Armies are furnished with 700,000 different items of equipment and supply . . . a ton a month for each man in combat. In the Leyte campaign . . . as at Salerno and Saipan, New Guinea and Normandy . . . the leading load carrier from beach to battle line was the Army's leading transport truck, the GMC 2½ ton "six-by-six." With its powerful "270" engine driving through all six wheels, it has proved to be as much at home in Pacific sand and swamp as in European mud and mire!

In addition to being one of the largest producers of military vehicles, GMC also manufactures many commercial trucks for essential users. These civilian GMCs are powered by engines of the same basic design as the famous GMC "270" used in the Army's leading transport truck.

INVEST IN VICTORY... BUY MORE WAR BONDS

GMC TRUCK & COACH DIVISION
General Motors Corporation

HOME OF COMMERCIAL GMC TRUCKS AND GM COACHES...
VOLUME PRODUCER OF GMC ARMY TRUCKS AND AMPHIBIAN "DUCKS"

ditions to the factory will cost a $750,000 ultimately

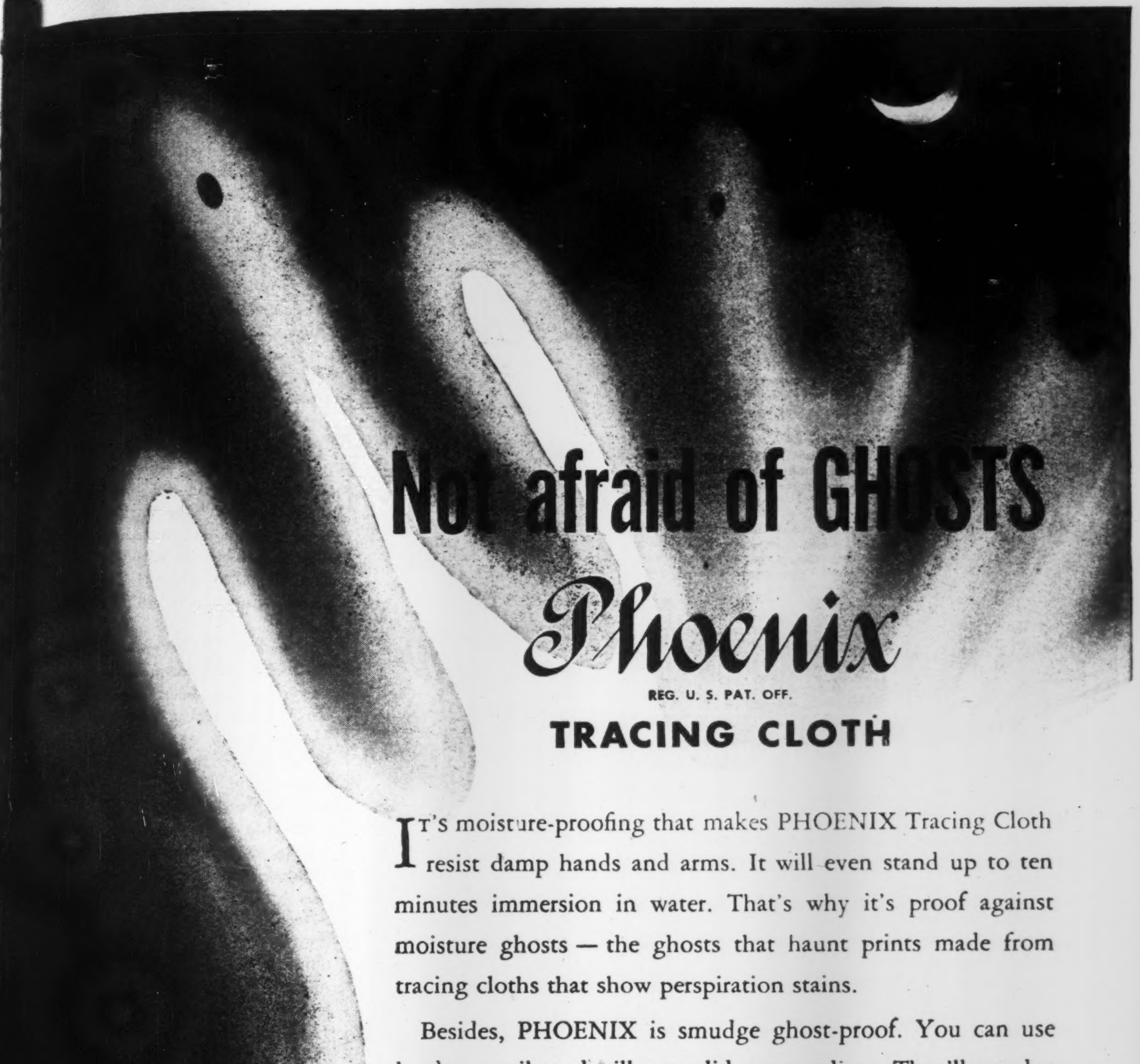
Richard A. Dittmar, manager of Hudson, N. Y., plant of Universal A Cement Co., New York, has been m chief engineer to succeed Sidney Robison, retired. Mr. Dittmar has b in charge of the Hudson plant s 1924. He has been with the comp 31 years, having started at the Hanni Mo., plant in 1913.

The Heil Co., Milwaukee, Wis., opened northwest district sales office Seattle, Wash., under the direction John Barclay, who has been with company many years, and will prov sales assistance for Heil dealers and d tributors in Washington, Oregon, Ida Montana and Wyoming.

John R. Hagemann, manager of e gineering in the steam turbine depa ment of the Allis-Chalmers Mfg. C Milwaukee, Wis., died recently. He w born in Switzerland and was graduat from the Swiss Federal Polytechnic I stitute in Zurich. He came to America 1927 and joined Allis-Chalmers t years later.

Frank T. Bumbaugh has been pr moted to manager of sales, alloy di sion, of the Carnegie-Illinois Steel Corp., U. S. Steel Subsidiary, according to a recent announcement. He succeeds the late Frank L. Gibbons, whose assistant he had been for the last three years. Mr. Bumbaugh began his employment wi Carnegie-Illinois Steel in 1926, tw years after his graduation from Lehig University with a degree in metallurgi cal engineering. In 1942 he was trans ferred to Chicago as assistant manage of alloy sales.

Pacific Car and Foundry Co. of Seattle and Renton, Wash., has bought the controlling interest in the Kenworth Motor Truck Corp., of Seattle, it was announced recently by Paul Pigott, president of Pacific Car. No changes are planned in the operation of Kenworth for the duration of the war, since both organizations will continue exclusively on war orders. New officers for the Kenworth Corp. are: President, Paul Pigott; vice-president, Ferdinand Schmitz; vice-president and general manager, John Holmstrom; vice-president, Vernon Smith; secretary-treasurer, John Cannon, assistant secretary



Not afraid of GHOSTS

Phoenix

REG. U. S. PAT. OFF.

TRACING CLOTH

It's moisture-proofing that makes PHOENIX Tracing Cloth resist damp hands and arms. It will even stand up to ten minutes immersion in water. That's why it's proof against moisture ghosts — the ghosts that haunt prints made from tracing cloths that show perspiration stains.

Besides, PHOENIX is smudge ghost-proof. You can use harder pencils and still get solid, opaque lines. They'll smudge less.

And erasure ghost-proof too. Erasing leaves less scars on PHOENIX. Redrawn pencil lines are smooth. Ink won't feather.

For the full story and a sample, write on your letterhead to Keuffel & Esser Co., Hoboken, N. J.

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EST. 1867

Drafting, Reproduction, Surveying Equipment
and Materials. Slide Rules. Measuring Tapes.

★

CHICAGO • NEW YORK • HOBOKEN • DETROIT
ST. LOUIS • SAN FRANCISCO • LOS ANGELES • MONTREAL

Shunk

GRADER AND SCARIFIER BLADES

For any type or make of machine—Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls, Snow Plows. Also—CUTTING EDGES, WEARING BOOTS, BACK SLOPERS, EXTENSION BLADES, MOLDBOARDS and SCARIFIER TEETH

50 years of specializing in the manufacture of Construction Equipment Blades has developed for your benefit a quality of special steel, milled through our own rolls and forged at the edges to give that extra cutting and wearing quality you need.

Furnished in various widths, lengths, and thicknesses, punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate — get set for Blades early.

Shunk
MANUFACTURING COMPANY
Established 1854
BUCYRUS, OHIO

AED MEMBER ASSOCIATED EQUIPMENT DISTRIBUTORS

Less "SEAT FAG" means MORE WORK Per Man Per Day!

★

By reducing operator "Seat Fag" in your shovel work, you can very definitely get *more work* per day out of your very limited available manpower. Milsco CUSHION SEATS are the answer.

The comfortable, form-fitting contour of the Milsco seat is heavily upholstered and covered with either genuine black leather or duck. Milsco seats are designed to fit both the operator and the equipment. Hinge attachment makes it ideal for use on cranes or shovels where cab space is restricted.

Write for your copy of Milsco *File Folder 44-A*. Describes and illustrates our complete line of Cushion Seats which are *immediately available*.

MILSCO MANUFACTURING CO.
2758-E N. 33rd Street • Milwaukee 10, Wisconsin

No. 813
Bucket Type Cushion Seat with back rest.

No. 763
Semi-Bucket Type Pony Seat.

Milsco MILWAUKEE *Cushion Seats* FOR FARM AND INDUSTRIAL EQUIPMENT

treasurers. K. T. Worthington and D. Pitss.

Herbert J. Barnsley, vice-preside of Jenkins Brothers, Bridgeport, Con valve manufacturers, has been plac in charge of manufacturing operatio to relieve Bernard J. Lee, vice-preside for other duties.

Link-Belt Speeder Corp. announ the appointment of Harold F. Allen chief engineer to succeed H. N. Ekbo who has been transferred to the eng neering division of the parent compan He joined the Link-Belt locomo crane department in 1916.

Alton Parker Hall has been pointed general manager of sales American Chain & Cable Co., Inc., 2 Park Avenue, New York City. Mr. Ha joined the company about a year ag after having been with Bethlehem Ste Co. for 22 years. He was graduate from Princeton in 1922.

What is Believed to be the larges malleable iron foundry built in the las 17 years has been completed by Th Rust Engineering Co. for Lake Cit Malleable Co. at Ashtabula, Ohio. Th facilities are financed and owned by Defense Plant Corp. The 3½-acre structure was authorized to fill the need fo malleable parts for military tanks an trucks, and for those being built for expanded domestic transport.

C. F. Oechsle, assistant vice-president of the Worthington Pump and Machinery Corp., has been placed in charge of the Worthington-Ransome construction equipment sales organization a Holyoke, Mass. He will be assisted by W. F. Lockhardt, sales manager of Ransome Machinery Co. at Dunellen, N. J., and W. J. Fleming, field sales manager at Holyoke. There are regional offices in New York, Washington, D. C., Cleveland, Chicago, and San Francisco.

Everett B. Michaels has been elected president of the Hyman Michaels Co., Chicago, Ill. Other officers elected are: W. J. Ross, first vice president; William Rosenthal, vice president; H. L. Purdy, vice-president; W. A. Newman, vice-president; and E. Michaels, secretary-treasurer.

U. E. Sandeben has been appointed manager of the Allis-Chalmers Mfg Co's., Seattle, Wash., district. He succeeds A. J. Schmitz, who has been named Pacific regional manager.

John Arthur Gillett, 70, for 5 years sales manager of the U. S. Quarr and Tile Co., Canton, Ohio, died Feb 23, in Columbus, Ohio.

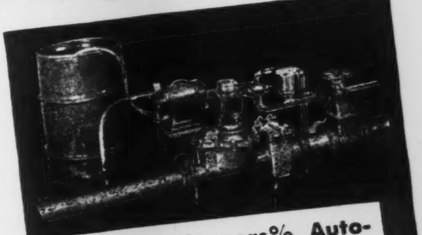
YOU CAN'T AFFORD "BY GUESS AND BY GOLLY" CHEMICAL FEEDING

YOU CAN AFFORD

% PROPORTIONEERS %

EXACT, AUTOMATIC, DEPENDABLE CHEMICAL FEEDERS

Hit or miss water treating methods are costly — they often result in dangerous undertreatment, or wasteful overtreatment with consequent disagreeable taste. %Proportioneers% Chem-O-Feeder will soon pay for itself in labor and chemical saved by automatically injecting *just* the right amount of chemical at *just* the right time. The Chem-O-Feeder, controlled by meter, starts, varies and stops feeding of the chemical as the water comes on, fluctuates and tapers off. For further information on safe, economical water treating ask for Bulletin SAN-1.



%Proportioneers% Automatic and Proportional Hydraulically operated High Pressure Chem-O-Feeder, controlled by standard water meter, to operate against pressures from 60 to 200 lbs. per square inch.

% PROPORTIONEERS. INC.%

92 CODDING ST., PROVIDENCE 1, R. I.

BATES GRATES
I'M THE GUY TO CARRY YOUR LOAD!

Mr. Fillet Weld

DOES A STRONG MAN ACT

● *Mr. Fillet Weld* is a tough guy. He holds together the Hex Cross Bars and the main bars of BATES • GRATES . . . and does it exceedingly well. In fact, the strength of BATES • GRATES exceeds all former standards set for open steel flooring and stair treads. That means BATES has greater basic load-carrying capacity.

that's only one reason why BATES • GRATES are better

● The greater strength factor is only one of the distinctive features of BATES • GRATES. The Fillet Welded Hex Cross Bars provide crisp, clean edges which give you non-slip grating for sure-footed safety. They are easier to clean and maintain. The design also allows maximum light and ventilation. All this adds up to:

Get a bid from BATES on every job where you need GRATES

WALTER BATES
COMPANY, INC.
JOLIET, ILLINOIS

HASTINGS asphalt blocks, produced for the last 60 years at Hastings-on-Hudson, N. Y., are to be manufactured in a new plant now being built by Hastings Pavement Co. at Flushing, New York City. Machinery has been moved from the Hastings plant and re-erected at the new location.

All company activities will be carried on under substantially the same administrative and operating personnel, Augustus E. Cohen remaining as president, with Joseph R. Kinney and Caleb Hyatt continuing as sales manager and chief engineer, respectively. The executive offices remain at 25 Broad Street, New York 4, N. Y.

WITH A VIEW to increased post-war selling activity, the Consolidated Conditioning Corporation of Mount Vernon, N. Y., has expanded its organization.

RUSSELL TREE, northeastern district manager of the Carrier Corp., has resigned his position to become president of the Consolidated Conditioning Corp. Ray Duncan and Lewis Wachs, sales engineers for the Carrier Corp., have also left that company to join the Consolidated sales staff.

WARREN WEBSTER & Co., steam heating equipment manufacturers of Camden, N. J., have recently announced the appointment of three new district representatives as follows: J. Edward Hesser at Tulsa, Okla.; John H. Spaan at Oklahoma City, Okla.; and Fred N. Schaad at Kansas City, Mo.

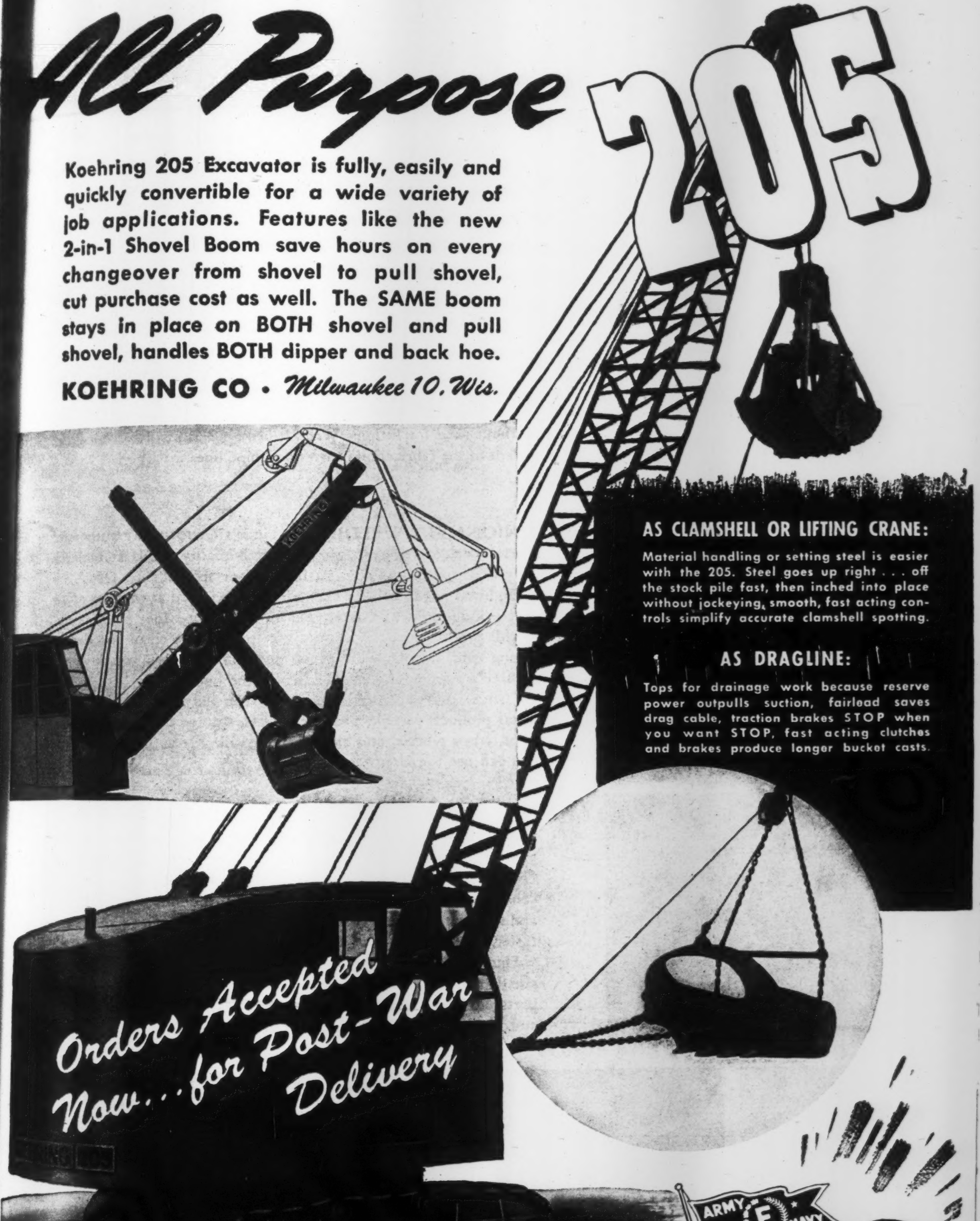
Mr. Schaad has been a member of the Webster organization for many years. Previous to his appointment at Kansas City, he was the Webster representative at Columbus, Ohio.

Messrs. Hesser and Spaan are newcomers in the Webster organization, but are well known in the heating industry in Oklahoma, where they have been established for some years.

LEONARD H. KRILL, of Hadlock-Krill Co., has been re-elected president of the Cleveland chapter of the Associated General Contractors of America. Others renamed were: Roy Brown, Brown Construction Co., vice-president; David Henderson, David Henderson & Son, treasurer; and Charles Jauch, executive secretary.

ANNOUNCEMENT is made by Northern Equipment, Erie, Pa., manufacturer of Copes feed water regulators and allied equipment, of the appointment of W. L. Hunter as chief engineer. He will supervise engineering, design and re-

All Purpose 205



Koehring 205 Excavator is fully, easily and quickly convertible for a wide variety of job applications. Features like the new 2-in-1 Shovel Boom save hours on every changeover from shovel to pull shovel, cut purchase cost as well. The SAME boom stays in place on BOTH shovel and pull shovel, handles BOTH dipper and back hoe.

KOEHRING CO • *Milwaukee 10, Wis.*

AS CLAMSHELL OR LIFTING CRANE:

Material handling or setting steel is easier with the 205. Steel goes up right . . . off the stock pile fast, then inched into place without jockeying, smooth, fast acting controls simplify accurate clamshell spotting.

AS DRAGLINE:

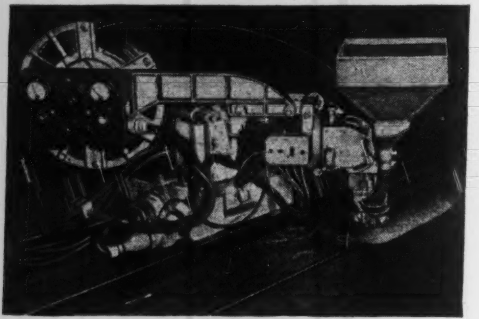
Tops for drainage work because reserve power outpulls suction, fairlead saves drag cable, traction brakes STOP when you want STOP, fast acting clutches and brakes produce longer bucket casts.

HEAVY-DUTY CONSTRUCTION EQUIPMENT

LINDE'S METALWORKING METHODS

Savings of time, money, and materials in the production of metals and in the fabrication of metal products are being made throughout industry by the use of Linde-developed methods for the cutting, joining and treating of metals. Applications of some of these methods are illustrated here.

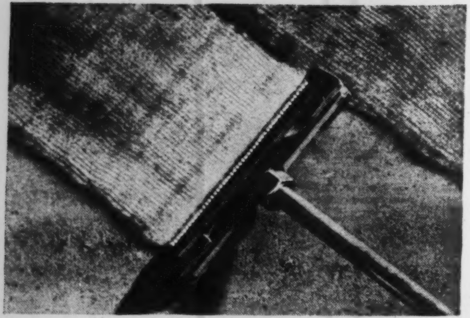
OXY-ACETYLENE HEATING — Heating for bending, straightening, and forming operations is facilitated by the intensely hot, easily controlled oxy-acetylene flame. Linde's method of wrinkle-bending, for example, produces smooth, sweeping bends, without thinning the pipe wall or creating internal obstruction to flow. Bends can be made in pipe of almost any diameter and at any angle—to fit any system as construction work progresses—without need for fittings. Wrinkle-bending also is used to a great extent in the fabrication of overland pipe lines.



UNIONMELT WELDING — Linde's UNIONMELT automatic electric welding process, produces high-quality welds at remarkably high speeds—without flash, glare, or sparks.

Eighteen-gage steel, for example, can be joined at the rate of 12 feet per minute . . . 1-inch steel as fast as one foot per minute. Welds produced by the UNIONMELT process are clean and dense, strong and ductile. Full penetration and uniform quality are assured by automatic controls set by the operator.

UNIONMELT welding is widely used in the fabrication of such metal products as pipe, pressure vessels, storage tanks, shell cases, ships, truck wheels, and anchor chains. Linde can show you how you can use the UNIONMELT process.



OXY-ACETYLENE FLAME-PRIMING — Oxy-acetylene flame-priming of steel storage tanks and other equipment, before painting, removes loose scale, rust, moisture, and corrosive salts. Flame-priming is followed immediately by wire brushing and close behind this comes the painting. As a result the metal is clean, dry, and still warm—causing the paint to go on faster, bond tighter, dry faster, and last longer.

Flame-priming can be applied to structures of practically any size. Irregularity of shape, recesses, rivets, or other "hard-to-get-at" parts offer no obstacle. This process is easy to learn, easy to use, and requires only a small amount of equipment.

FLAME-GOUGING

With OXWELD blowpipes quipped with gouging nozzles, groove of surface metal can e removed without harm to djacent areas, eliminating hipping and grinding.

OXY-ACETYLENE CUTTING

Portable machines or manually operated blowpipes speed fabrication of piping systems and cutting of structural steel for construction work.

OXY-ACETYLENE WELDING

Welding with the oxy-acetylene flame produces strong, compact piping systems that are leakproof, easily insulated, and practically maintenance-free.

FLAME-STRAIGHTENING

The intense heat of oxy-acetylene flames can be used on the job to straighten steel plate and structural members that have become bent or warped.

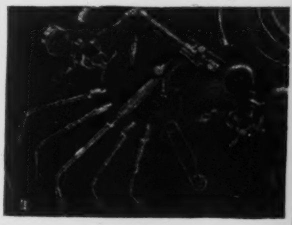
Help to Speed Production . . . Lower Costs

OXWELD apparatus includes blowpipes, attachments, regulators, manifolds, cutting machines, acetylene generators, and related equipment and supplies for every application of the oxy-acetylene process. This equipment can be depended on to give efficient, economical service with a minimum of maintenance.

MACHINE APPARATUS

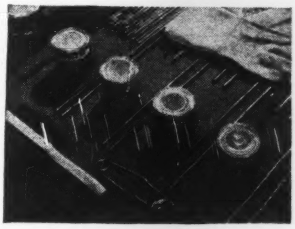
Included in the OXWELD line of apparatus are portable and stationary oxy-acetylene machines for cutting shapes or straight lines; flame-hardening apparatus; bar and billet cut-off machines; automatic welding equipment; and tractor units for plate-edge preparation.

HAND APPARATUS

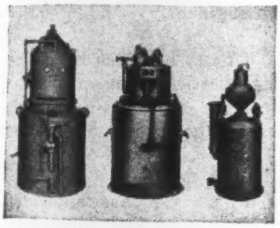


Oxy-acetylene apparatus which may be ordered from Linde includes oxy-acetylene blowpipes for all welding and heating work; oxy-acetylene cutting blowpipes, cutting attachments, and nozzles; oxy-acetylene descaling an flame-priming equipment. OXWELD apparatus is supplied fro Linde offices and warehouses. The PUROX and PREST-O-WEL line, and PREST-O-LITE air-acetylene appliances for solderin and brazing, are distributed by industrial and automoti jobbers.

WELDING RODS AND SUPPLIES



The many kinds and sizes of OXWELD high quality welding rods make it possible to select the one that will give best results on each job. The OXWELD line also includes fluxes, gloves, goggles, lighters, hose, and asbestos paper. Rods and supplies may be ordered from Linde or from automotive and industrial jobbers.



GENERATORS AND MANIFOLDS

OXWELD acetylene generators have maximum generating capacities of from 30 to 9,000 cu. ft. per hour. OXWELD manifolds centralize oxygen and acetylene supply from cylinders.

OXYGEN, ACETYLENE, CARBIDE

A booklet describing use of LINDE oxygen, PREST-O-LITE acetylene, UNION carbide, and OXWELD apparatus in these and other processes will be sent without charge on request. Ask for Form 5268A.

LINDE
OXYGEN
UNION CARBIDE

BUY UNITED STATES WAR BONDS AND STAMPS

MARITIME "M" AWARD
FOR OUTSTANDING
PRODUCTION ACHIEVEMENT

THE LINDE AIR PRODUCTS COMPANY

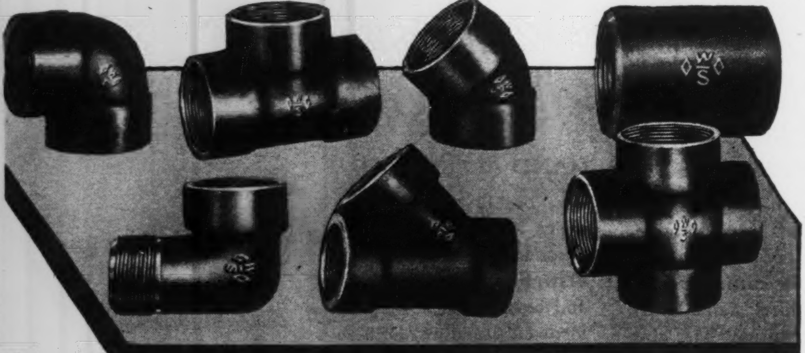
Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York 17, N. Y. UCC Offices in other Principal Cities
In Canada: Dominion Oxygen Company, Limited, Toronto

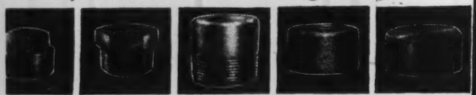
LINDE OXYGEN . . . PREST-O-LITE ACETYLENE . . . UNION CARBIDE
OXWELD, PUROX, PREST-O-WELD, UNIONMELT APPARATUS
OXWELD AND UNIONMELT SUPPLIES

The words "Linde," "Prest-O-Lite," "Union," "Oxweld," "Purox," "Prest-O-Weld," "Haynes Stellite," and "Unionmelt" are trade-marks of Union Carbide and Carbon Corporation or its Units.

"PERFORMANCE-PROVED" QUALITY
IN W-S FORGED STEEL PIPE FITTINGS
MEANS *EXTRA STRENGTH, SAFETY, SERVICE*



THE COMPLETE LINE of Watson-tillman Forged Steel Pipe Fittings is ıanufactured under the same *Quality* rocedures that have characterized all Vatson-Stillman products during 97 ears of experience in dealing with igh pressures. Available to you in crew and Socket Welding types—in arbon Steel, Carbon-Molybdenum eel, Chromium-Molybdenum Steel, ıd Stainless Steel. The Double-iamond trade mark is your guarantee *"Performance-Proved" Quality.*



FORGED STEEL SCREWED FITTINGS

Long threads, accurately cut, perfectly aligned, for quick, easy installation. Uniform wall thickness throughout assure a higher factor of safety. Long low bands extend beyond last thread to insure extra strength and better wrench grip. Sizes: ⅛" through 4" I.P.S., 2000 — 3000 — 6000 Pound Classes.

SOCKET WELDED TYPE

Speed up and simplify installation because deeper sockets eliminate necessity of cutting pipe to exact lengths. The deep socket furnishes support for the pipe and provides self-alignment. No special fixtures are needed for lining up and holding joints. PROVED WELDABILITY. Sizes: ¼" through 4" I.P.S. For Schedule 40—80—160 and XX Pipe.

W S

WATSON-STILLMAN
ROSELLE, NEW JERSEY • *Distributor Products Division*
Designers and Manufacturers of Forged Steel Fittings, Valves, Wire Rope Shears, Pumps, Jacks, Pipe Benders and Hydraulic Equipment
9
RK OF QUALITY
INGS • VALVES • WIRE ROPE SHEARS • PUMPS • JACKS • *Sold Through Leading Distributors*

It's easier to lift, lower, push or pull the Simplex Way!

Simplex Jacks

for every construction purpose
Awarded the Gold Medal for Safety
Ask for Catalog 44
Templeton, Kenly & Co., Chicago 44, Ill.

DRILLING CONTRACTORS

▼

CORE BORINGS
DIAMOND & SHOT CORE DRILLING
LOAD TESTS—TEST PITS

▼

THE GILES DRILLING CORPORATION
10 East 40th Street New York, N. Y.

search. Associated with the company for 18 years, he has had wide experience in feed water control, desuperheating, and pressure reduction.

The post of assistant chief engineer will be taken over by H. A. Schlieder, associated with the company for eight years. He was graduated from Rensselaer Polytechnic Institute in 1932, and has had considerable design and field experience.

H. H. Weining is director of research. A graduate of Pennsylvania State College in 1926, in recent years, he has devoted his efforts to development, testing, and critical analysis of design and construction of equipment.

D. H. YOUNG of New York has been appointed director of exports for the Universal Engineering Corp., Cedar Rapids, Ia., manufacturers of rock and ore crushing, screening, conveying and storage machinery, gravel washing and screening plants and portable asphalt mixing plants. He will appoint dealers in many foreign countries.

CHAS. F. HALL, president of the Acme Equipment Co., Allison Park, Pa., for the past 19 years, has opened offices at 614 Bessemer Building, Pittsburgh 22, Pa., to handle new and used industrial, contractors' and mining equipment.

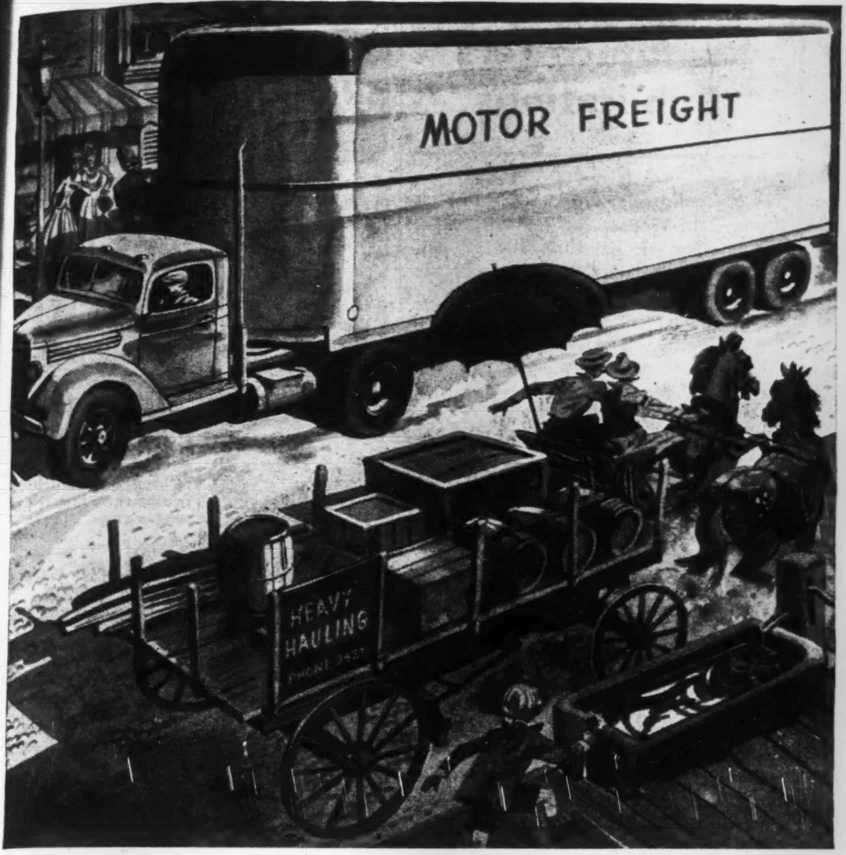
J. K. THOMPSON has been promoted to assistant manager of its Gary, Ind., plant by the American Bridge Co., subsidiary of the United States Steel Corp. Mr. Thompson aided in building the Gary plant, in 1909. He first became associated with the company in 1901, serving at the Trenton, N. J., plant as construction engineer.

JAMES A. QUAID, has been appointed Philadelphia district manager for the Pressed Steel Co. of Wilkes-Barre, Pa., with offices in the Broad St. Station Bldg.

MARLOW PUMP CO. has appointed Tractor & Machinery Co., 351 Whitehall St., S. W., Atlanta, Ga., as distributor in Atlanta and western Georgia.

WILLIAM CAMERON & CO. INC., lumber dealers and manufacturers of building materials, has bought five acres of land at Houston, Tex., for postwar enlargement of its wholesale, warehouse and distribution facilities.

TO PROMOTE dissemination of technical data, the principal United States manufacturers of anti-friction bearings have formed the Ball and Roller Bearing Information Center, at 16 East 48th St., New York, N. Y. It welcomes inquiries concerning anti-friction bearings, their applications and maintenance.



There's been a big chang

★ "Heavy hauling" has shown amazing progress since the days of the horse-drawn dray.

Tapered roller bearings have advanced, too. The most notable improvement was made when Tyson developed the "all rolls" design . . . added 30% more load-carrying rollers around the racewa

Though interchangeable with other taper roller bearings, Tyson carries greater loads . has maximum rigidity . . . *lasts almost twice long.* For every heavy-duty job, depend on Tysc

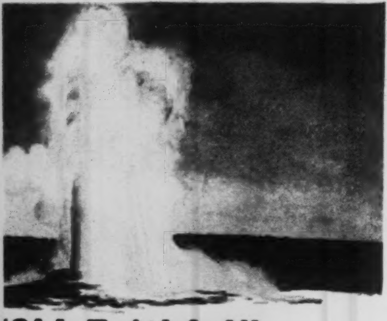
TYSON BEARING CORPORATION • MASSILLON, OHIO

COUNT THE ROLLS • THE ROLLS COUNT

Tyson

TODAY'S HEAVY-DUTY BEARING

★ BUY AND KEEP WAR BONDS ★



'Old Faithful"
performance
forever

Unfailing
Water Supply
From Deep Wells . . .

ELIABILITY of Peerless Pumps never has een so evident as during the war. Countss factories, plants, farms and municialities rely on them to give unfaltering ervice. Thousands of Peerless Pumps ave been in operation for more than 10 ears without need for repair. Precise facry methods insure continued operation. ecause of the exclusive engineering degn, construction and fine workmanship f the bowl and impeller assembly, origial efficiencies are closely maintained over greatly extended performance period.

FEATURES — *(Turbine Type)*

ater-cooled head bearings • hoice of oil or water lubrication • ouble Bearings in each bowl • ully-enclosed impellers • Double eal impellers.

Capacities—10 to 220,000 gallons per minute

erless Distributors and Direct Factory presentatives are located in every State.

PEERLESS
PUMPS
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HYDRO-FOIL
EERLESS PUMP
DIVISION
od Machinery Corporation
West Avenue 26, Los Angeles 31, California
50 Camden Avenue S.W., Canton 6, Ohio
er Factories: San Jose 5, Fresno 16, California

Manufacturers' Publications

Air Conditioning Postwar Products—A new 84-page catalog featuring heating, cooling, air handling and air conditioning equipment is now available. Sufficient data on capacities, roughing-in dimensions, etc., are given to make it possible to choose conveniently this type of equipment.—*The Trane Co., La Crosse, Wis.*

Chain Hoists—A 12-page bulletin describes and illustrates a line of chain hoists and trolleys and tells how to use and care for such equipment.—*Chester Manufacturing Co., Lisbon, Ohio.*

Lighting Hangers—A 20-page pamphlet describes hangers particularly designed for use with high-positioned combination twin or triple unit mercury and incandescent lighting equipment, also where color lighting or various degrees of illumination is required. The hangers enable floor or ground level washing, relamping of, and repairs to the lighting fixtures.—*The Thompson Electric Co., 1101 Power Ave., Cleveland 14, Ohio.*

•

Welding Symbols—An informative wall chart, illustrating the basic characters of welding symbols recommended as American standard by The American Welding Society, has been published.

The graphical language of the welding industry is illustrated separately for fusion and resistance welding. Location of the symbols, numerical and other data on the reference line is illustrated to show the standard manner of placing proper information on the symbols.

Twenty-three typical welded joints and sections, covering butt welds, lap welds, tee welds, corner welds, and edge welds, are illustrated and marked with the standard welding symbols applying to that particular joint or section.—*The Hobart Brothers Co., Hobart Square, Troy 1, Ohio.*

Steel Castings—The whole story of steel castings and their importance in American industry is told in a 64-page profusely illustrated booklet.—*Steel Founders Society of America, 920 Midland Bldg., Cleveland, Ohio.*

Industrial Sound Control—Illustrations of typical installations, sound and frequency tests make up an interesting booklet about sound insulations for in-

GREATER POWER
EASIER HANDLING
LONGER LIFE

GATKE Brake Blocks and Frictions
Disc Type Clutch Facings

GET THINGS DONE
with
GATKE
High-Heat-Resisting
Asbestos
BRAKE MATERIALS
Service-proved for every Brake and Clutch requirement of Excavating, Road Building and Construction Equipment. Just tell us what you need.

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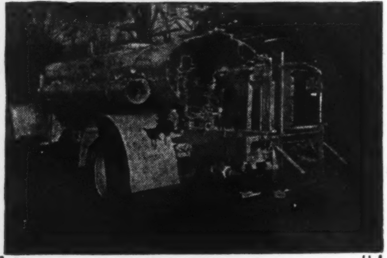

Equipped with the famous KINNEY SD Rotating Plunger Pump, accurate as a meter. Applies bitumen in exactly the quantity specified by the Road Engineers. Spreads all grades of tar, asphalt, road oil and cut back as well as emulsions used in surface treatment, mix-in-place, subsoil stabilization, or penetration construction.

Write for further information.

KINNEY
MANUFACTURING COMPANY
3527 Washington St.
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BRANCH OFFICES: New York • Chicago • Philadelphia • Los Angeles • San Francisco

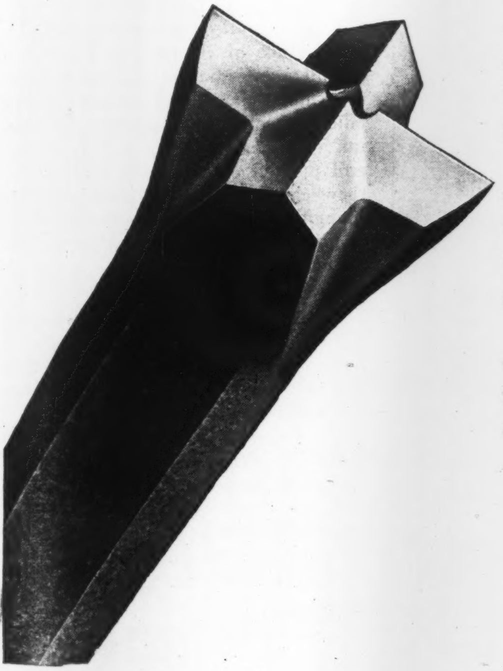
We also manufacture Liquid and Vacuum Pumps, Strainers, Clutches and Cut-off Couplings.

3 VIEWPOINTS ON SUPERIOR HOLLOW DRILL STEEL

THE DRILL RUNNER SAYS:
"I like this hollow steel because it holds its edge better, cuts fast, and gives me top footage."

THE METALLURGIST SAYS:
"The analysis looks good and the balanced grain structure reduces progressive fatigue failure."

THE BLACKSMITH SAYS:
"I like it because it makes up easily, has a wide quenching range, and gives a better hardness under heat-treatment."



Three separate viewpoints, but all of them mighty important where there's rock to be drilled. The drill runner, the blacksmith, and the metallurgist like Bethlehem Superior for different reasons, but essentially all the reasons boil down to this single point: *Faster drilling at lower cost.*

Bethlehem Superior is tough, resilient, shock-resisting—yet sufficiently deep-hardening to produce a shank that withstands the punishing blows of the piston. It's a hollow steel that's equally suitable for both forged-on bits and fabricated rods used with detachable bits.

Like most mining and contracting men, you're probably well acquainted with Bethlehem Superior. If not, ask your Purchasing Department for some of it when you need your next drill steel. After that, we think you'll be calling for it all the time

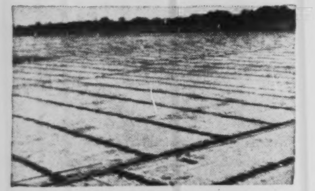
★ BETHLEHEM STEEL ★

SISALKRAFT

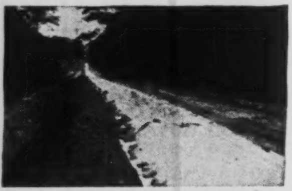
BLANKETS
SAVE TIME,
MANPOWER
AND MONEY
IN CURING!

SISAL REENFORCEMENT GIVES STRENGTH AND TEAR RESISTANCE

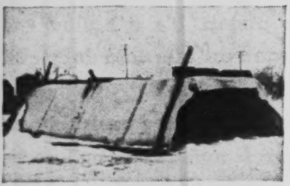
LOW-COST PROTECTION On ALL Road Jobs!



PROTECTING SOIL CEMENT



PROTECTING ROAD MIX



PROTECTS MATERIALS STORED IN THE OPEN

UNMATCHED in their ability to hold moisture within the slab, SISALKRAFT Road Blankets have a time-proven record as the Number One concrete curing agent — producing denser, longer lasting concrete roads at low cost.

Savings in time, manpower and money are effected by the speed with which two men apply SISALKRAFT Blankets over the slab. No sprinkling — no burlap — just "let 'em lay." The concrete cures automatically! The slab is protected from weather and dirt! The blankets are used again and again.

Protect soil cement, road mix, materials and equipment with SISALKRAFT. It's tough, weatherproof, scuffproof, tear-resistant!

As vital war needs decrease, more and more SISALKRAFT will be available for your use. Victory comes first — and that's the way you want it, we're sure.

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY

Manufacturers of
SISALKRAFT, FIBREEN,
SISAL-X, SISALTAPE AND
COPPER-ARMORED SISALKRAFT

dustrial plants.—*Homestead Industrial Sound Control, Hartford, Conn.*

Ballasts for Fluorescent Units—A catalog tells of a new technique in ballast construction for fluorescent lighting equipment. Models are illustrated. Specific data and dimensions are tabulated for reference. Installation and operation techniques are demonstrated. —*Hudson American Corp., 25 West 43d Street, New York 18, N. Y.*

Boilers and Radiators—A booklet is the first of a series of guides incorporating the latest technical data on installation methods of these products.—*The Institute of Boiler and Radiator Mfgrs., 60 E. 42nd St., New York 17, N. Y.*

X-Ray Diffraction—The following industrial applications for X-ray diffraction are listed in a new 4-page leaflet: Establishment of identities in ceramic clays; determination of covering quality of paint pigments; identification of aluminum oxide modifications; differentiation of inorganic fibers; metallic deposition in formation of metallic carbides; determination of character of metallic films.—*North American Phillips Co., Inc., 100 East 42nd St., New York 17, N. Y.*

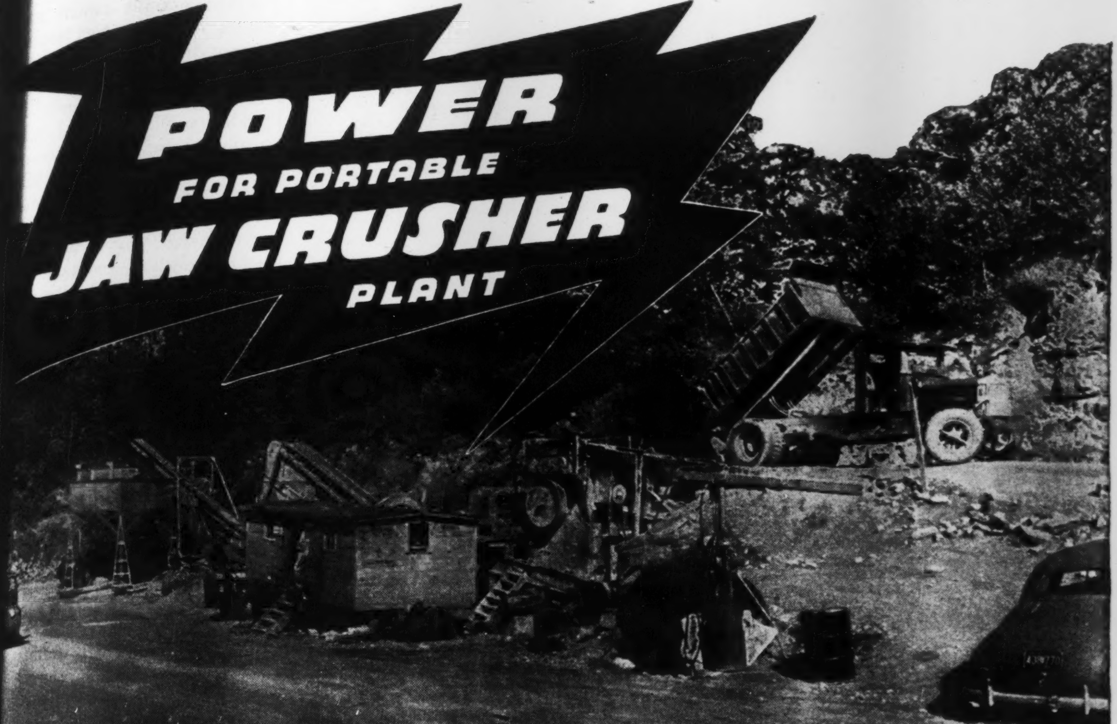
Building Panels—Announced in a new catalog are building panels that may be used to sheathe the floors, walls, partitions and roofs of virtually all types of buildings. The new products provide both framing and covering material in a single unit.—*Detroit Steel Products Co., Detroit, Mich.*

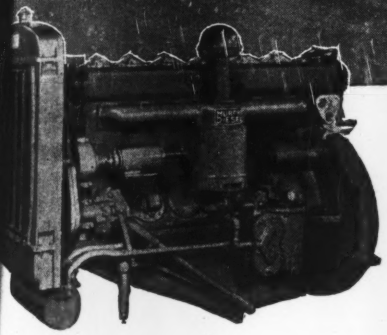
Engine-room Operators' Guide—A large book of illustrated charts gives complete information on engine operation, maintenance and lubrication, periodic inspection, adjustments and tune-up. The charts are thoroughly indexed and printed on washable stock so that they can be kept in good condition though constantly used.—*Detroit Diesel Engine Division, General Motors Corp., Detroit 23, Mich.*

Resistance Welding Control —Designed to set forth simply how welding processes differ, how electronic control for resistance welding works, and how this method of control extensively adapts this welding process to industry, a new seven-part training course by slide sound films, lesson books, quiz book, and an instructor's manual has been prepared.—*Westinghouse Electric and Mfg. Co., Extension Training, 306 Fourth Ave., Pittsburgh, Pa.*

Dimensional Stability—A technical booklet lists and describes the results

POWER
FOR PORTABLE
JAW CRUSHER
PLANT





Model ME-6, 5¾ x 6½, 6 cyl., 160 H.P. Murphy Diesel, powering Universal Engineering Company's Portable Jaw Crusher, owned by Art Overgaard, Elroy, Wis.

MURPHY DIESELS give a good account of themselves wherever called upon to power machinery for the construction industry, because they are engineered for the rugged service demanded from rock crushers, hoists, sand and gravel plants, pumps, excavating and loading machines, locomotives, logging and lumber plants, mines, barges, tugs, work boats . . . for heavy electrical loads . . . and for other heavy-duty jobs which they do economically and well.

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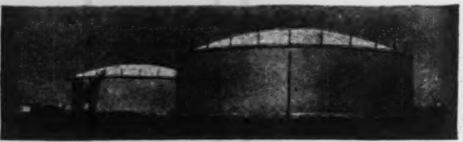

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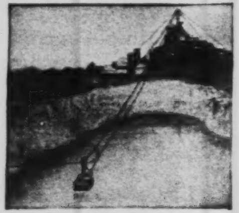

(At Top) Sauerman Cableway at work in wet sand pit. (Lower View) Mobile scraper unit loads trucks with gravel.

MAJOR savings result when Sauerman Power Scrapers and Slackline Cableways are used in sand and gravel excavation, stockpiling and other material-handling jobs where the long operating range of these machines can be employed to advantage.

With one man at the controls, and with a relatively small expenditure of power, a Sauerman machine will dig, haul and automatically dump a large hourly tonnage of any class of earth or bulk material. Moreover, the first cost of the equipment is moderate and upkeep is simple.

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of dimensional stability tests
losic plastics at high tempera
humidities. These data indic
high acetyl cellulose and cell
tate butyrate have similar di
stability when exposed to tes
ditions simulating temperate
cal climates, while ethyl cellu
tics have superior dimensional
Color sketches, photographs,
prehensive tables, an explan
test conditions, and a discussio
contained in the sketches, pho
and tables make this booklet a
hensive source of engineeri
Hercules has also just issued
interesting booklets—"Labors
for Peace" and "Hercules Pro
Cellulose Products Dept.,
Powder Co., Wilmington 99, D

Sewage Ejector—A bulletin
a piece of equipment said to
work of a small centrifugal p
pumping sewage, drainage, c
and heavy liquids with compre
or steam. Included are new
tailed drawings, illustrations a
neering data which should pr
ful to men in the engineering a
struction field.—*Yeomans*
Co., 1433 N. Dayton Street, Chic
Ill.

Glass Tanks—A circular tell
glass tanks for hot acids, elec
ing, dyes, foods and other hard
dle solutions. The tanks are mad
heavy plates of specially heat
glass showing great resistance
pact. Special tanks can be fab
for practically any use.—*Pitt*
Plate Glass Co., 632 Duquesne
Pittsburgh, Pa.

Speed of Rotating Parts—A b
describes four models of indi
mount tachometers and a multi
portable hand tachometer. It
both full-face and profile views
tachometers, r.p.m. ranges avai
mounting dimensions, and inc
prices for tachometers and appurt
a section on use and operation,
general installation data.—*Jones*
trola Co., Fairfield Avenue, Stam
Conn.

Incinerator Buckets—A 20-page
letin illustrates and describes the
sign and application of clamshell b
ets for handling refuse and gar
For the benefit of designing engi
and municipal authorities, this bul
also includes illustrations showing
progress of materials through a mo
municipal incinerator plant, a
description of the operation, and
on the cost.—*The Blaw-Knox div*
of the Blaw-Knox Co., Blawnox, P

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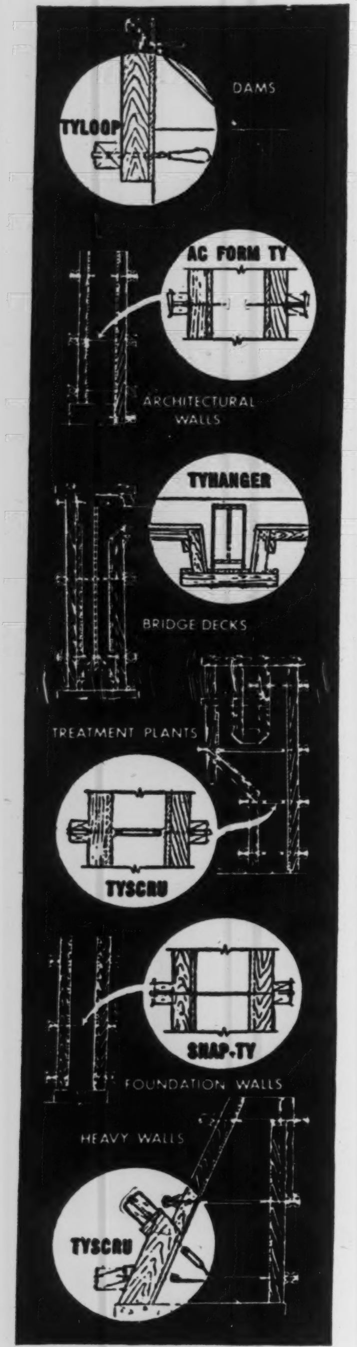

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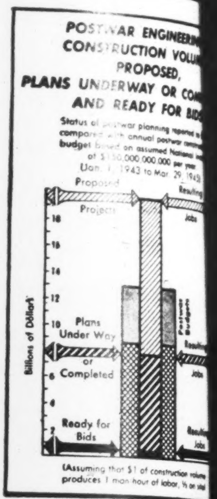
POSTWAR PROJ



Projects proposed for postwar
have been published in these c
January, 1943 as they have been
ENGINEERING NEWS-RECORD.

Statistics based on these reports
the Committee on Postwar Constru
American Society of Civil Engineers
the progress of plans for postwar pro

The chart above shows, both in es
lar volume and in jobs or man-yea
how fast this reservoir of future work

WATER SUPPLY

PROPOSED WORK

Calif., Dinuba—City, City Hall,
addnl. pump. plant and w
$60,000.

Calif., Porterville—City, City H
water sys. **$30,600.**

Calif., Tulare—City, City Hall,
well, lines. **$20,000.**

Calif., Woodlake—City, City Ha
sewerage sys. **$60,000.**

Mass., Rowley—Town, Bd.
Town Hall, water supply sys.
$25,000.

N. Y., Fairport—Village, imp
$32,000. State Aid Planning Fund

N. Y., Glens Falls—City, new
$102,933. State Aid Planning
lotted.

N. Y., South Glens Falls (
Falls)—Village, imprv. water
$17,000. State Aid Planning Funds

N. Y., Tonawanda—City, City Ha
watermains. **$103,600.** State Aid
Funds allotted. CD 11/2—ENR 11

N. Y., Victory Mills—Village, w
ply sys. **$50,000.** State Aid Plann
allotted.

N. Y., West Carthage—Village, w
ply intake and supply main.
State Aid Planning Funds allotted.

Tex., Galveston—Island Water C
Imprvt. Dist. 6, Courthouse, W
$125,000. Financing not provided.

★ **B. C., New Westminster**—New W
ster and other Fraser Valley Mu
ties, New Westminster, Fraser Valley
works. **$6,000,000.**

B. C., West Vancouver—Municipal
newing wooden pipes, etc., in wate
sys. About **$180,000.**

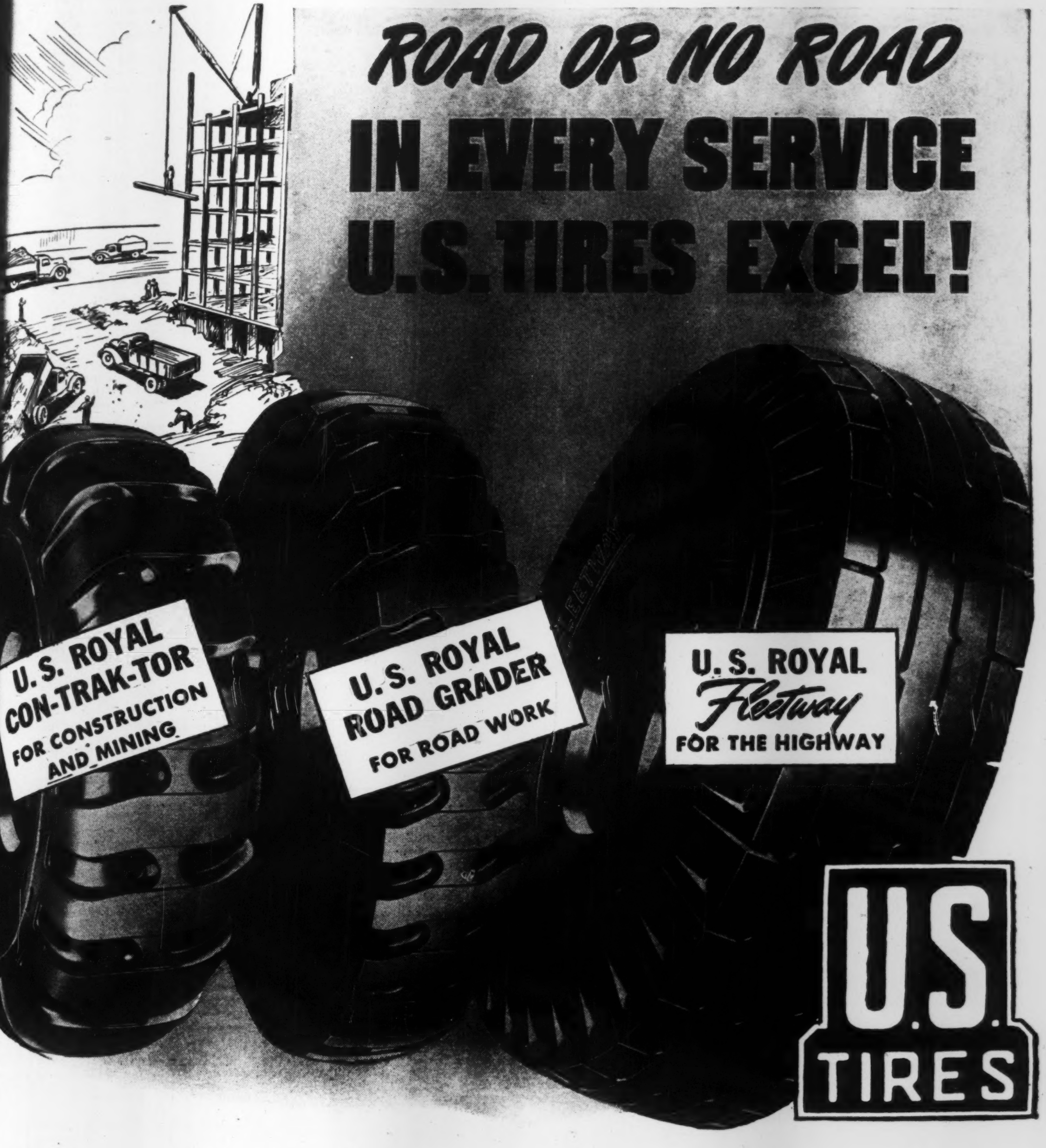
B. C., West Vancouver—Muni
Mathers Watermain. About $220,0

PLANS UNDER WAY

Calif., Hillsborough—City, City
reservoir, **$30,000;** watermains, $15,00
Wilsey, City Hall, engr.

Calif., Santa Cruz—City, City Hall,
water sys. **$200,000.** H. N. Jen
Madrono Ave., Palo Alto, consult.
engr. D. M. McPhetres, City Hall,
city engr.

★ **Ill., Chicago**—City Dpt. P. Wks.,
Purification Div., City Hall, prel
plans under way Central Dist.
plant, 528 m.g.p.d. capacity, $40,
North district filtration plant, 228
capacity, **$17,000,000.** Financing no
vided. J. R. Baylis, c/o owner, engr.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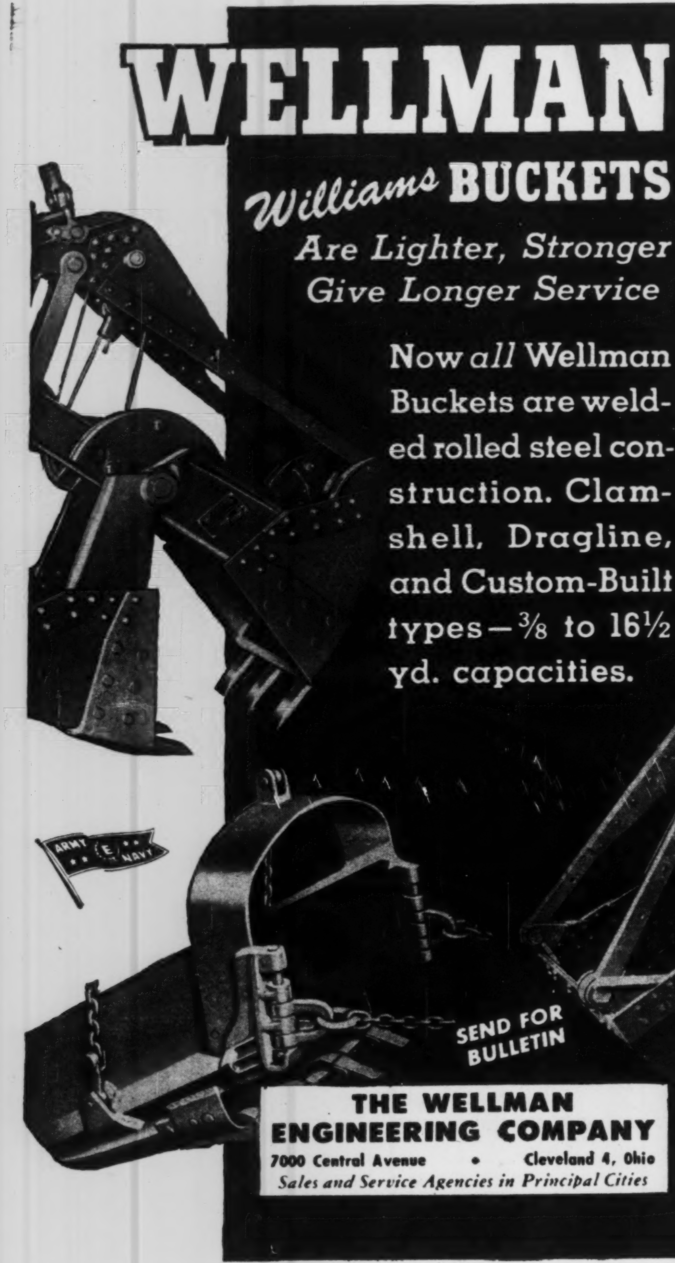
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TREATING PLANTS
Jacksonville, Fla. Norfolk, Va.
Long Island City, N. Y.

POSTWAR PROJECTS (Cont'd.)

Mass., Wenham—Town Bd. S
Town Hall, preliminary plans
water supply sys., 2000 gal. steel
10 mi. 8- to 12-in. watermains.
H. E. Bailey, 177 State St., Boston,
engr. CD 6/29—ENR 7/13.

★ **Minn., Minneapolis**—City, C. C.
clk., City Hall, plans 50% comple
imprvs. over 15-year period, incl.
48 in. steel main from Columbia
Filtration plant along east boundary
and under Mississippi River, serv
section; laying 48 in. pipes along 3
and Girard Ave. north; several feed
across Mississippi River; construc
water basin repumping station at C
Heights filtration plant; imprv.
pump. station, incl. bldg. of recar
plant; reservoir and pump. sta
42 St. and France Ave. S.; install
gates, miscellaneous mains in vario
tions, etc. Total est. $6,000,000. P.
City Hall, City engr.

N. J., Belleville—City, City Ha
under way water pipeline in Wa
Ave. **$58,000.** Financing availa
Welsh, Town Hall, engr.

Okla., Blackwell—City, City Ha
70% completed water softener an
extens. **$95,000.** Financing provided
& Veatch, 4706 Bway., Kansas C
consult. engrs. E. A. Jones, Ci
city engr.

Okla., Durant—City, City Hall, p
completed new and larger filter plant
equip., addnl. watermains, new
storage tank and fire hydrants,
Financing not provided. L. V.
Durant, consult. and city engr. CD
ENR 11/2.

Pa., Waynesboro—Waynesboro Bor
Main St., plans under way imprv
$25,000. Gannett, Fleming Corddry
penter, Inc., 600 N. 2 St., Harrisburg,
engrs. B. F. Smith, boro engr.

Tex., Harlingen—Central Power
Co., E. C. Bennett, local mgr., 120 W
son St., water sys. expan., installin
ters, laying mains, etc. Alfred Tam
First St., consult. engr.

Tex., Pharr—City, A. Kelley, may
Hall, plans 50% completed filters,
units, 10 and 12 in. c.i. pipe, etc. f
lines. **$40,000.** Financing provide
Tamm, 107 S. 1 St., Harlingen, consu
CD 1/25—ENR 2/8.

Va., Richmond—Henrico Co., Bo
Richmond, Zone 7, plans 75% co
water distr. sys. for 140 homes.
Financing not provided. T. Ellett,

Wis., Wisconsin Rapids — City,
Grand Ave., plans 10% completed sup
from wells to connect with present
sys. Foth, Boyd & Porath, Gree
consult. engrs.

Ont., Elora—Council, Reeve H.
chn., plans under way WW sys.
$50,000. Phillips & Co., Dalhousie St.,
ford, engrs. CD 11/15—ENR 12/14.

Ont., Portsmouth—Municipality, W
sys. **$75,000.** C. T. Smith, Kingston

★ **Ont., Sarnia**—City, W. C. Hipple,
Miss M. D. Stewart, clk., City Hal
under way WW sys. imprvs. About
Gore & Storrie, 1130 Bay St., Toronto,
CD 10/20/43—ENR 10/28/43.

SEWERS, WASTE DISPOS

PROPOSED WORK

Calif., Salinas—City, City Hall, in
sewage disposal, **$150,000;** storm wat
er sys., **$116,000;** airport district s
sewer lines, **$50,000.**

Calif., Tulare—City, City Hall,
sewer extens., imprvs., **$132,317;** sewer
ment plant imprvs., **$20,000.**

★ **Calif., Oakland**—City, City Hall,
election May 8, storm and sa
sewers. **$5,311,000.** CD 11/18/43,
ENR 11/25/43, 3/22/45.

Calif., Visalia—City, City Hall, rep
streets and curbs. **$50,000.**

Calif., Woodlake—City, City Hall,
exten. **$15,000.**

★ **Mass., Boston**—City, Dpt. P. Wks.,
T. Morrissey, comr., City Hall, in
tor, Albany St. **$700,000.**

N. Y., Ballston Spa—Village, Village
storm sewer imprvs. in 6 streets,
State Aid Planning Funds alloted.

★ **N. Y., Glens Falls**—City, City
storm and sanitary sewers.
State Aid Planning Funds allotted.

N. Y., Monroe—Village, sewerage sy
posal plant, **$250,000.** State Aid Pla
Funds allotted.

N. Y., Ovid—Village, sewerage sys.
posal plant, **$180,000.** State Aid Pla
Funds allotted.

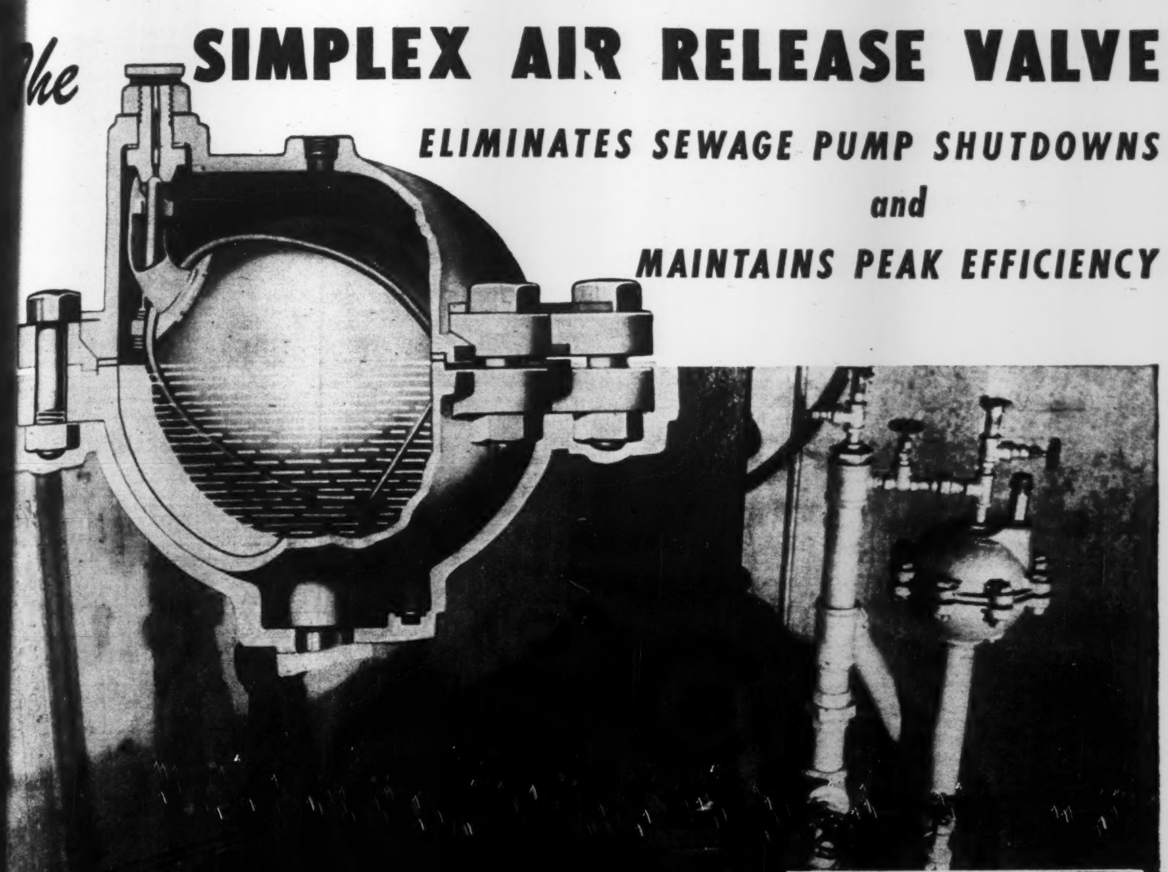
N. Y., Wellsville—Village, storm
drainage, **$40,000.** State Aid Planning
allotted.

N. Y., Whitesboro—Village, sewage
ment plant, outfall sewer, **$72,000.**
Aid Planning Funds allotted.

Okla., Granite—Bd. Affairs, Capitol,
homa City, sewage disposal plant at
Reformatory. **$40,000.** Financing not
vided.

he SIMPLEX AIR RELEASE VALVE

ELIMINATES SEWAGE PUMP SHUTDOWNS and MAINTAINS PEAK EFFICIENCY



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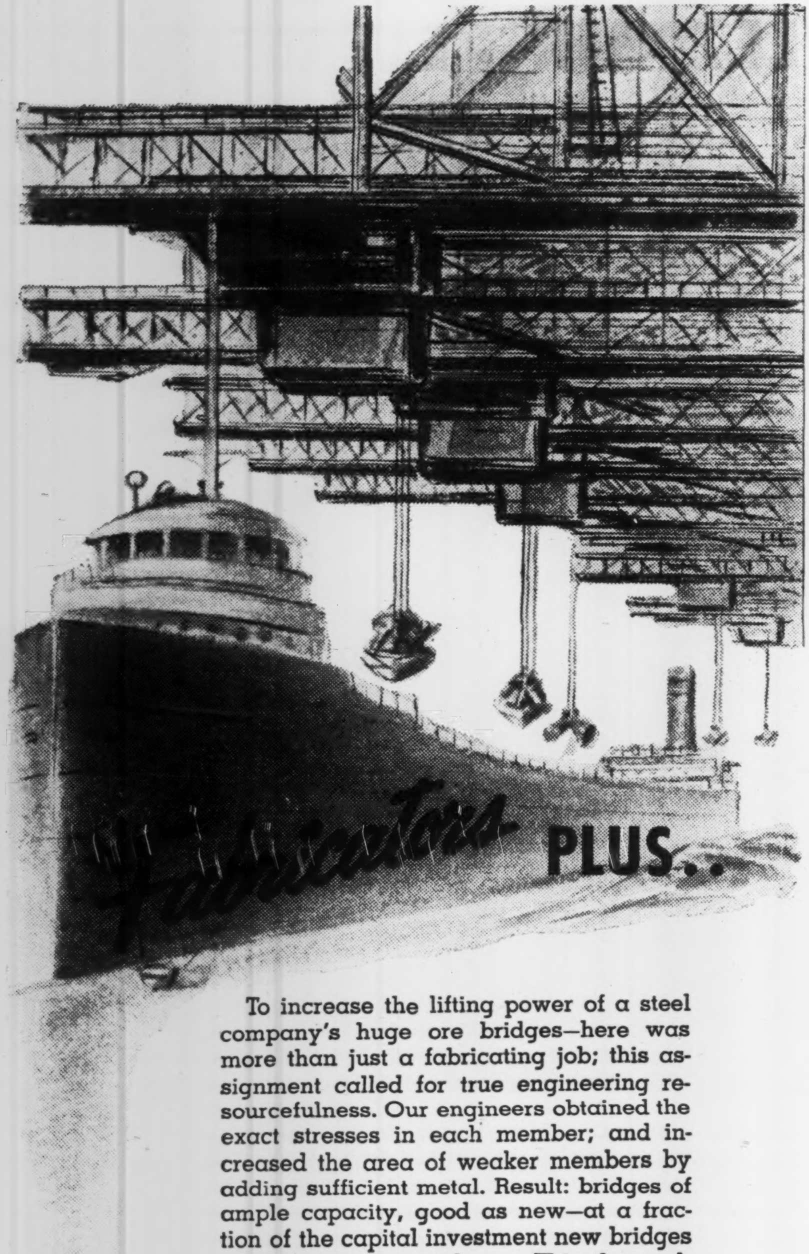

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MELROSE PARK (Chicago Suburb), ILLINOIS
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POSTWAR PROJECTS (Cont'd.)

R. I., Jamestown—[illegible] n. F. Caswell,
Town Council, sanit[illegible] sewers, Ma
Cove. Over **$25,000.** Financing not
vided.

★**Tex., Galveston**—[illegible] City Hall, sa
sewer lines, **$2,000,000.** Financin
provided.

Wash., Bryn Mawr—Bryn Mawr
Dist., 11409 87 Ave. [illegible] Seattle, Zo
sewerage sys. **$350,000.**

★**B. C., West Vancouver**—Municip
installing sewerage sys. in heavy
up areas. About **$500,000.**

PLANS UNDER WAY

Calif., Hillsborough—City, City Hall,
fall sewers. **$60,000.** E. P. Wilsey,
Hall, engr.

★**Calif., Modesto**—City, City Hall,
election Apr. 10, sewerage sys.,
trial waste plants, **$325,000;** storm s
$275,000. F. J. Rossi, City Hall, city
CD 2/20—ENR 3/8.

Calif., Redwood City—City, City
plans under way sewage disposal
$300,000. W. G. Frost, 58 Turnsworth
Redwood City, and H. N. Jencks, 345
drono Ave., Palo Alto, consult. engrs.
Clark, City Hall, city engr. CD 12
ENR 12/28.

★**Calif., Salinas** — Monterry Co.,
House, plans 80% completed Se
Sanitary Sewers **$618,000.** Pajaro sew
sys. **$90,000,** Financing not provided;
Seaside Storm Water Sewerage Sys., $11
Spreckels Junction Sewerage Sys., $8
Aromas Sewerage Sys., $30,000; Castr
Sewerage Sys., **$45,000;** Alisal Storm W
Sewerage Sys., **$105,000;** Chualar Sew
Sys., **$48,000.** H. F. Cozzens, Court H
co. engr.

Calif., Santa Cruz—City, City Hall, i
sewerage sys. distr. plant, $150,000;
collective sys., **$100,000;** contemplated O
Outfall Sewer, **$50,000.** H. N. Jenks,
Madrono Ave., Palo Alto, consult. san
engr. D. M. McPhetres, City Hall, a
city engr.

Calif., Stockton—San Joaquin Co., C
House, plans under way, sewers at co
hospital, **$40,000,** Financing provided;
ers in East Stockton, $40,077, Finan
not provided. J. B. Manthey, Court H
engr. CD 2/8—ENR 2/22.

★**Ill., Chicago**—Bureau Sewers, Dpt
Wks., City Hall, plans completed
Sewer Proj., **$1,200,000;** Taylor-14 St. S
$1,650,000; West Side Proj., $4,487,000; S
Side Proj., **$4,072,000;** constructing, re
structing city-wide sewers, $2,000,000;
lina Sewer Proj., **$2,921,000;** Kostner
Sewer **$16,700,000;** Addison Proj. $1,158
Beverly-Calumet **$9,238,000;** Wright
Sewer, **$8,400,000;** Ardmore Sewer $300
Roscoe Sewer **$7,720,000;** Ainslee-Pratt S
$3,996,000; Imlay Sewer **$400,000;** 130
Sewer Proj., **$5,454,000.** Financing not
vided. T. D. Garry, sewer supt.

Ill., Normal—City, City Hall, prelimi
sketches new storm sewers throughout t
outside town limits, **$500,000.** Plans
election Apr. 3. J. J. Woltman, 315 U
Bldg., Bloomington, consult. engr.

Ill., Pekin—City, City Hall, South
sanitary laterals, **$250,000,** B. F. Smith,
McLean St., consult. engr.; North Side s
tary sewer, **$135,000.** E. Fitzgerald, Co
Bldg., city engr.

Ill., Pekin—City, City Hall, plans c
pleted South Side sanitary trunk line, $
000. Financing not provided. B. F. Sm
709 McLean, consult. engr.

Minn., Alexandria—City, City Hall, p
50% completed expan. sewerage treatm
plant. **$150,000.** Toltz, King & Day, I
1509 Pioneer Bldg., St. Paul, consult. en

Minn., Lake Benton—Village, plans
completed storm sewer. **$35,000.** C. Ze
ner, Ivanhoe, engr.

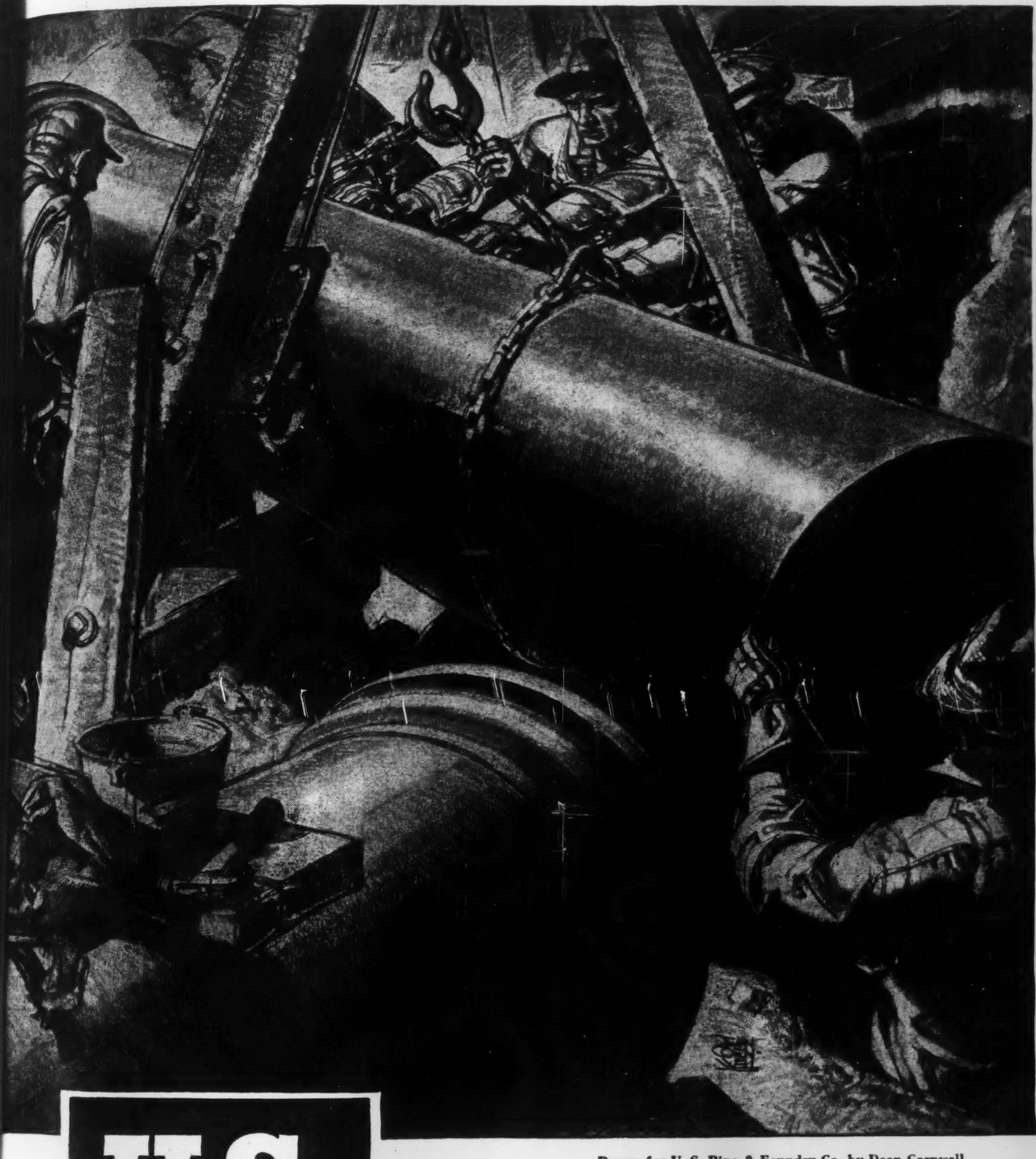
★**Minn., Minneapolis**—City, C. C. Swans
clk., City Hall, plans 50% completed
mi. storm drains, tunnels, covered in
year program, **$7,000,000.** F. T. Paul, C
Hall, engr.

★**Mo., St. Louis**—City, M. M. Kins
pres., Bd. Pub. Service, 304 City Ha
12 and Market Sts., Zone 1, plans un
way constructing, completing River D
Peres Foul Water Sewer. $2,750,000. H
ner & Shifrin, Shell Bldg., 1221 Lo
St., Zone 3, consult. engrs. CD 5/—EN
5/18.

N. Y., Bear Mountain—Dpt. P. Wks. St
Office Bldg., Albany, Zone 1, plans und
way by C. L. Bogert, 624 Madison Ave. N
York, Zone 22, sewage treatment plant
Bear Mountain State Park, CON-50,
Palisades State Park Comn., Conservati
Dpt. **$45,000.** Financing not provided.
11/30—ENR 12/14, under WW.

N. C., Chapel Hill—Town, J. L. Caldwe
mgr., City Hall, plans under way sew
disposal plant. **$106,000.** Gilbert C. Wh
Co., Chapel Hill, consult. engrs.

O., Lakewood—City, City Hall, plans 5
completed interceptor sewer. $200,0
Land rights not cleared. E. A. Fish
14532 Lake Ave., city engr.



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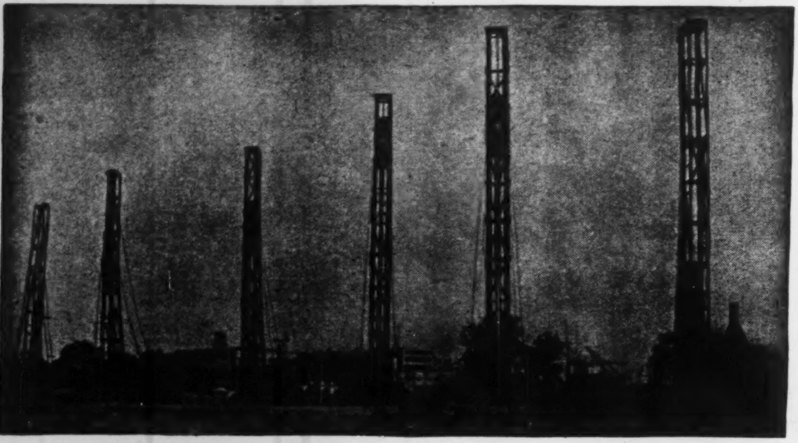

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Products Include: Concrete Vibrators, Gas or Electric, Surfacing Attachments, High Speed Tools • Vibratory Concrete Finishing Screeds • Rotary Concrete Floor Finishing Machines • Portable Gas Electric Generator Plants, 500 Watt to 17000 Watt, Voltage Regulators and Portable Mountings Optional • Master Flood and Shovel Lights • Electric or Gas Engine Driven Power Blow Hammers

POSTWAR PROJECTS (Cont'd.)

PLANS UNDER WAY

Okla., Blackwell—City, City Hall, pla 60% completed storm and sanitary sew exten. **$120,000.** Land rights not cleare legal obstacles to be overcome. Financin provided. E. A. Jones, City Hall, city eng

Okla., Durant—City, City Hall, plans completed addnl. sanitary sewer mains e ten. sewage disposal plant $75,000. Finan ing not provided. L. V. Stinson, Duran engr. CD 9/28—ENR 10/12.

Okla., Mangum—City, City Hall, pla 50% completed sewage disposal plan **$35,000.** Financing not provided. Alexan der & Pollard, Terminal Bldg., Oklahom City, consult. engrs.

Pa., Collingdale—Collingdale Boro, E. C Rohland, secy., sewage disposal plant. Ore **$25,000.** Damon & Foster, Sharon Hi consult, engrs.

★ **Pa., Johnstown**—City, City Hall, plan 80% completed combined sewage treat ment plant and garbage incinerator, **$600, 000.** Land rights not cleared, financing no provided. Wm. A. Goff, Broad Street Sta tion, Phila., Pa., consult. engr. H. Le Wilson, 205, City Hall, city engr. CD 2/7— ENR 2/22.

Pa., Johnstown—Lorain Boro, 376 Ohi St., plans 75% completed sanitary sewer t be tapped into city of Johnstown sewe when completed, **$65,000.** Financing no provided. K. Christie, 1205 Franklin St engr.

Tex., Mission—City, City Hall, plans 40% completed sanitary sewerage sys. imprvs. collection lines, increasing pump. capacity, enlarging disposal, etc. **$80,000** bond election Mar. 17 for same. H. H. Ewing, Mission, consult. engr.

Tex., Pharr—City, A. Kelley, mayor, City Hall, plans 50% completed expan. disposal plant, etc. **$60,000.** Financing provided. A. Tamm, 107 S. 1 St., Harlingen, consult. engr. CD 1/25—ENR 2/8.

Vt., Brattleboro—Town, Bd. Selectmen, Town Hall, preliminary plans under way sewerage sys., disposal plant, incl. sanitary mains and treatment plant, **$250,000.** Financing not provided. Barker & Wheeler, 36 State St., Albany, N. Y., consult. engrs.

★ **Va., Arlington (br. Wash., D. C.)**—Bd. Comrs. Arlington Co., plans under way sewage treatment plant. **$500,000.** Financing provided. Alexander Potter Assoc., 50 Church St., New York 7, N. Y., consult. engrs.

Wash., Snohomish—City, City Hall, plans completed sewerage sys., with disposal plant. **$260,923.** Financing not provided. Parker & Hill, Smith Tower, 2 and Yesler Sts., Seattle, Zone 4, consult. engrs. CD 2/12 —ENR 3/18.

Ont., Elora—Council, Reeve H. Walser, chn. Com., preliminary surveys and estimates under way sewerage sys. **$40,000-$50,000.** Phillips & Co., Dalhousie, Brantford, engrs. CD 11/15—ENR 12/14.

★ **Ont., Sarnia**—City, W. C. Hipple, mayor, Miss M. D. Stewart, clk., City Hall, plans under way sewage sys. imprvs. About **$800,000.** Gore & Storrie, 1130 Bay St., Toronto, engrs. CD 7/6—ENR 8/10.

READY FOR BIDS

Minn., Ivanhoe—Village, Ivanhoe, plans completed treatment plant. **$25,000.**

★ **Wash., Puyallup**—City, City Hall, plans completed sewage disposal plant and sewerage sys. addn. **$600,000.** Financing provided. Parker & Hill, Smith Tower, 2 and Yesler Sts., Seattle, Zone 4, consult. engrs. CD 2/23—ENR 3/8.

BRIDGES

PROPOSED WORK

Calif., Salinas—City, City Hall, Alisal Street grade separation at railroad crossing. **257,000.**

Ill., Pekin—Tazewell Co., Court House, I-beam, concrete bridge across Macinaw River, on State Aid Route 1, Old Springfield Rd. from East Peoria through Delevan to Springfield, 2 mi. south of Dillon, **$70,000.** E. Mitchell, Court House, co. supt. hys.

★ **Mass., Boston**—Boston Port Authority, W. J. McDonald, sponsor, 6 lane hy. bridge across harbor, Dewey Square to McClellan Hy., South Station to East Boston Airport. **$12,000,000.** Financing not provided.

B. C., West Vancouver—Municipality, bridge on lateral high level road joining up with North Vancouver. About **$80,000.**

PLANS UNDER WAY

Calif., Fresno—Fresno Co., Court House, ½ mi. bridge on Whites Bridge Rd. at Firebaugh, **$100,000; 980 ft.** bridge on Parkhurst Ave. at Hardwick, **$50,000.** A. J. Nielsen, Court House, co. engr. CD 11/5/43—ENR 11/11/43.

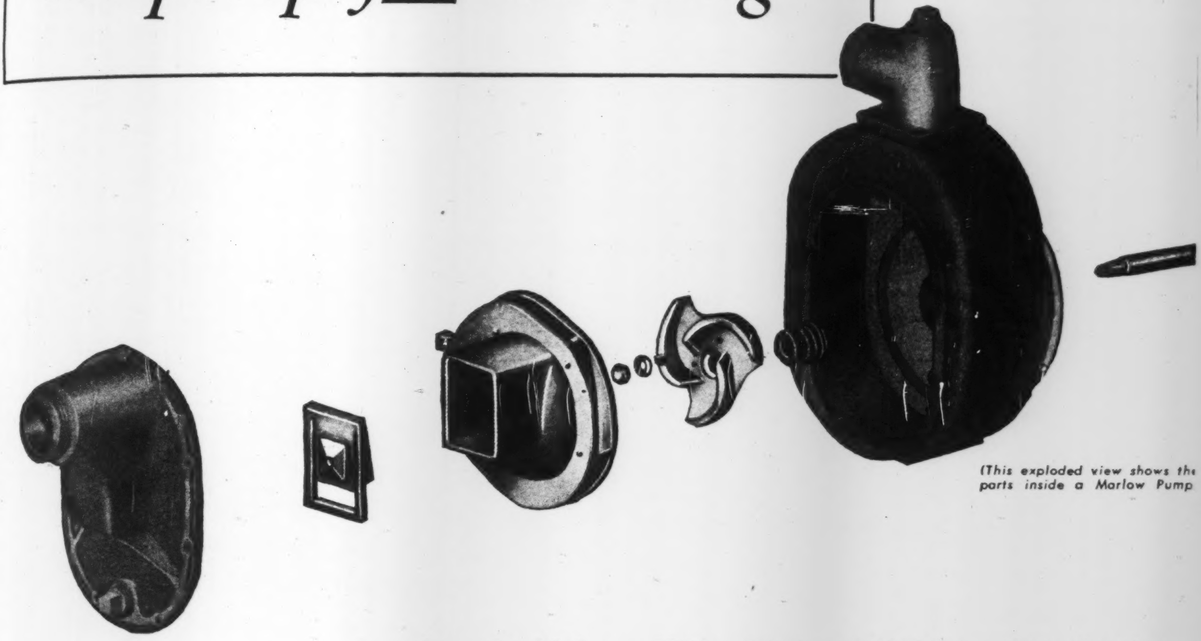
Calif., Salinas—Monterey Co., Courthouse, San Lucas Bridge, **$84,000;** Old Toll Bridge, **$76,000;** and overpass, Pajaro, **$77,000.** Financing not provided. H. F. Cozzens, Court House, engr.

★ **Calif., Stockton**—San Joaquin Co., Court House, Stockton, plans under way bridges and viaducts, incl. Benson Bridge, **$138,375;** Tracy Island Bridge, **$239,850;** Peltier

Have you looked

INSIDE

the pump you are using?



(This exploded view shows the parts inside a Marlow Pump

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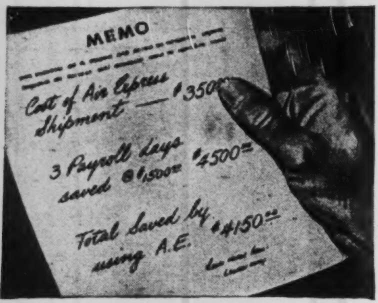

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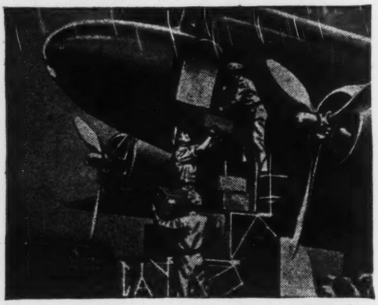

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POSTWAR PROJECTS (Cont'd)

Bridge, **$94,300;** Walnut Grove Bridge, **$158,875;** Lockford Bridge, $97,325; Ophir St. Bridge, **$18,450;** Jack Tone Bridge, **$84,750;** Alpine Rd. Bridge, $23,000; Bethany Rd. Bridge, **$7,415;** Pescadero Colony Bridge, **$30,030;** Corral Hollow Bridge, $17,730; plans San Joaquin River Bridge, $138,975; replace 10 ferries by bridges, $1,800,000; Harding Way grade separation, $254,000; Middle River Bridge, **$175,000;** Jacobs Rd. Bridge, **$293,000;** Pock Lane Bridge, $6,650; Kaiser Lane Bridge, **$36,000;** Wermuth Rd. Bridge, **$22,200;** Van Allen Rd. Bridge, **$6,000;** Dry Creek-Dustin Rd. Bridge, **$24,000.** Financing not provided. J. B. Manthey, Court House, co. engr. CD 2/12—ENR 2/22.

★**Calif., Visalia**—Tulare Co., Court House, plans under way 6 bridges in Road Dist. 3, replacing present Demaree, Patterson, Hicks, Santa Fe, Doakes and Wells Bridges over St. Johns River, $400,000; bridge over Kings River on El Monte Way near Dinuba in Dist. 4, **$180,000.** Donald R. Warren Co., 500 S. Figueroa St., Los Angeles, consuult. engrs. CD 3/22.

★**Ill., Chicago**—City Dpt. P. Wks., City Hall, preliminary plans under way S. Archer Ave. bridge, single or double leaf bascule, steel. **$1,000,000.** W. W. DeBerard, City Hall, city engr. S. Michuda, City Hall, engr. of bridges.

★**Ill., Chicago**—City, Dpt. P. Wks., City Hall, plans 80% completed N. Halsted St. River Bridge, double leaf bascule, steel, **$1,210,000,** plans 90% completed E. 95 St. Bridge **$1,600,000,** plans under way W. Congress St. Bridge **$1,800,000,** plans 60% completed W. Harrison St. Bridge, double leaf bascule, steel, **$1,225,000.** Financing provided; preliminary plans under way W. Grand Ave. Bridge, double leaf bascule, steel, **$2,000,000,** N. Halsted St. (Chicago Ave.) Viaduct, steel, **$700,000;** steel, concrete deck N. Halsted St. Viaduct (Kinzie St.) **$500,000,** Financing not provided. W. W. DeBerard, City Hall, city engr. S. Michuda, City Hall, engr. of bridges.

Minn., Baudette—Lake of the Woods Co., Baudette, plans 90% completed concrete bridge with approach grading about 1½ mi. **$25,000.** Minneapolis Bridge Constr. Co., 3049 N. E. 6 St., Minneapolis, consult. engrs. M. M. Nygaard, Baudette, co. engr.

Minn., Red Lake Falls—Red Lake Co., Red Lake Falls, plans 60% completed constructing 6 bridges, surfacing, drainage, curb and gutter, etc., 33 mi. roads. **$325,000.** Financing not provided. B. J. Pinsonneault, Red Lake Falls, engr.

Ore., Hood River—Hood River Co., Hood River, plans 50% completed county bridges, **$100,000.** Financing not provided. C. M. Hurlburt, co. engr.

Ore., Oregon City—City, City Hall, Singer Hill Crossing, **$25,000;** Madison St. Bridge, **$15,000;** Pearl St. Bridge, **$15,000;** 12 St. Bridge, **$20,000.** A. E. Miller, city engr. CD 9/29—ENR 10/19.

★**Ore., Portland**—Multnomah Co., 601 Court House, Portland, plans under way bridge to Sauvies Island, **$450,000;** rebuilding miscellaneous wooden bridges, **$180,000;** repair Willamette River Bridge, **$250,000,** Financing available; Morrison St. Bridge, **$6,500,000,** Financing not provided. G. W. Buck, co. engr.

Washington—State Hy. Dpt., C. E. Hickey, dir., Olympia, plans under way fixed bridge over Columbia River Reservoir with 480 ft. long center span, at Northport, Stevens Co. Over **$25,000.** Financing not provided.

READY FOR BIDS

Ill., Chicago—City, Dpt. P. Wks., City Hall, plans completed, widening steel, concrete bridge, W. Irving Park Rd., **$180,000;** W. Van Buren St. Temporary bridge, bob tail swing bridge, substructure, concrete and pile, **$220,000.** Financing available. W. W. DeBerard, City Hall, city engr. S. Michuda, City Hall, engr. of bridges.

STREETS AND ROADS

PROPOSED WORK

★**Calif., Oakland**—City, City Hall, bond election May 8, street imprvs. **$4,950,000.**

Calif., Porterville—City, City Hall, street imprvs. **$45,000.**

★**Calif., Salinas**—City, City Hall, imprv. John St. from South Main to Abbott Sts., **$157,500;** Abbott St. from John St. to southerly city limits, **$168,500;** John St. from S. Main St. to Lincoln Way, **$96,000;** Alisal St. widening and imprv. from Monterey St. to easterly city limits, **$178,500;** Lincoln St. widening John St. to Market St., **$212,000;** widening Pajaro St. from John to East Market Sts., **$100,000;** exten. W. Alisal St. from Homestead Ave. to westerly city limits, **$12,500.**

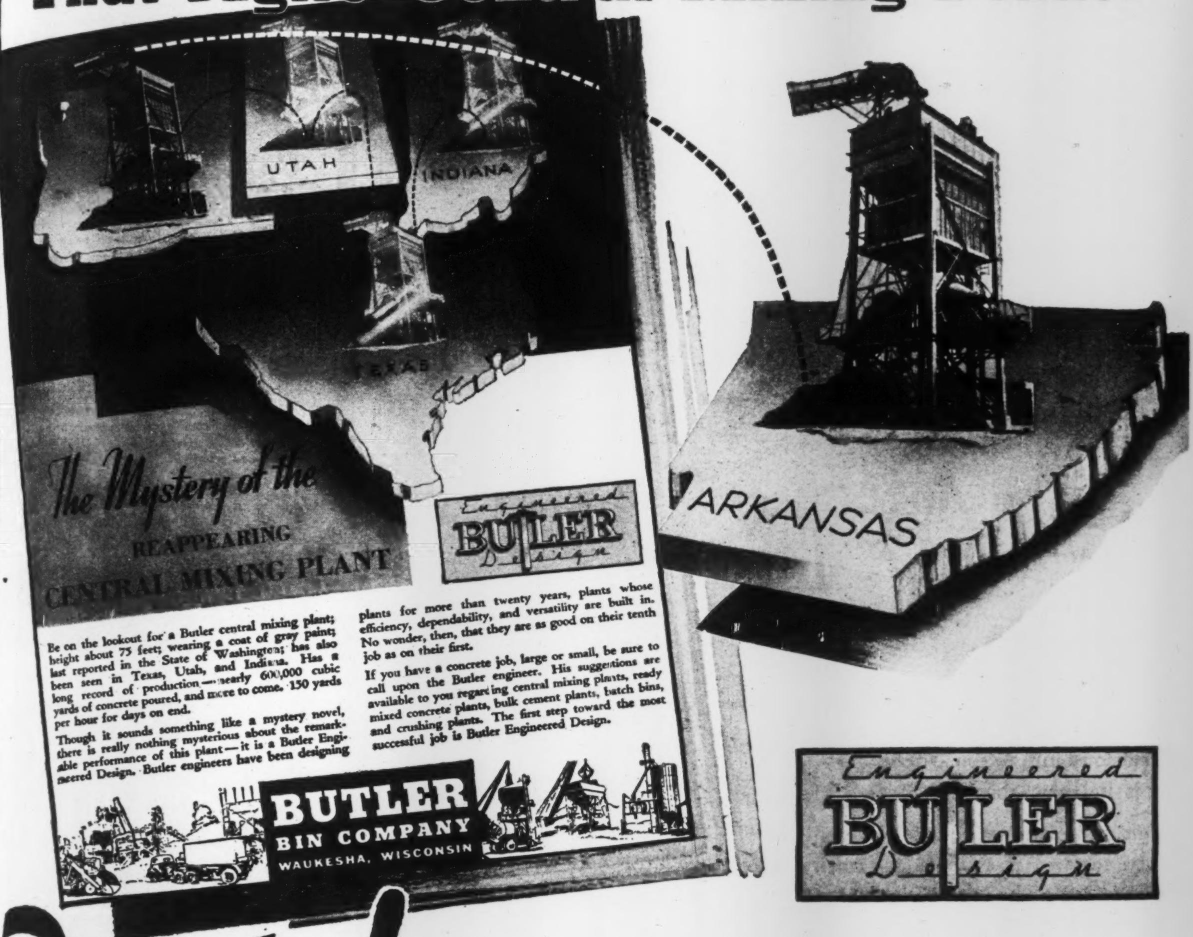
Calif., Tulare—City, City Hall, curbs and gutters, **$190,325;** sidewalks, **$51,600;** street grading, **$44,748;** street oiling, **$32,335.**

Calif., Visalia — City, City Hall, repairing streets and curbs. **$50,000.**

Ill., Pekin—City, City Hall, drive and river front rehabilitation, **$75,000.**

Do You Remember —

That Agile Central Mixing Plant?



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CENTRAL MIXING PLANT

Engineered BUTLER Design

Be on the lookout for a Butler central mixing plant; height about 75 feet; wearing a coat of gray paint; last reported in the State of Washington; has also been seen in Texas, Utah, and Indiana. Has a long record of production — nearly 600,000 cubic yards of concrete poured, and more to come. 150 yards per hour for days on end.

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POSTWAR PROJECTS (Cont'd.)

Ill., Pekin—Tazewell Co., Court House, grading, graveling, culverts and bridge, Sect. 15 M.F.T. **$75,000.** E. Mitchell, Court House, county supt. hys.

★**N. Y., Glens Falls**—City, City Hall, citywide street and sidewalk construction. **$792,000.** State Aid Planning Funds allotted.

Washington—State Hy Dpt., C. E. Hickey, dir., Olympia, high exten. from Maryhill to Kennewick. **$100,000.** Financing not provided.

PLANS UNDER WAY

★**Calif., Salinas**—Monterey Co., Court House, plans 30% completed imprv. Canyon del Rey, **$30,000,** Financing not provided; plans under way Carmel Valley Rd. imprv., **$340,000;** Financing available; plans street imprvs., incl. San Miguel Canyon, **$42,000;** Monterey-Pacific Grove via Presidio **$57,000,** Alisal Dist to 101 Highway South **$260,000,** Alisal Dist. to Natividad Rd. **$44,000,** Laureles Grade **$175,000,** Vineyard Canyon Rd. **$42,000,** Lonoak Rd. **$28,000,** Jamesburg-Arroyo Seco **$84,000,** and Peachtree Rd. **$29,000,** Financing not provided. H. F. Cozzens, Court House, engr.

★**Calif., Salinas** — Monterey Co., Court House, plans 80% completed imprv. Watsonville-San Jaun Rd., **$90,000;** plans 75% completed imprv. Del Monte Ave., **$420,000;** plans 25% completed imprv. Lighthouse Ave., **$56,000;** plans 20% completed imprv. Junipero Ave., **$101,000;** Arroyo Seco Rd., **$160,000;** plans 15% completed imprv. Alisal Rd. and underpass, **$486,000.** Financing not provided. H. F. Cozzens, Court House, engr.

Calif., San Bruno—City, City Hall, plans 85% completed widening, extend. Herman Ave. from Euclid Ave. to north city limits, ½ mi. **$52,000.** Land rights not cleared. C. L. White, City Hall, city engr. CD 2/13—ENR 3/8.

Calif., Santa Cruz—City, City Hall, plans under way imprv. Cathcart St., **$20,000;** Front St., **$50,000.** D. M. McPhetres, City Hall, acting city engr.

★**Calif., Stockton**—San Joaquin Co., Court House, Stockton, plans under way, imprv. Thornton Rd., **$24,187;** Tracy Island Rd., **$13,564;** Peltier Rd., **$63,437;** Walnut Grove Rd., **$13,130;** Acampo Rd., **$16,500;** Copperopolis Rd., **$114,439;** Ophir St., **$22,550;** Pershing Rd., **$91,000;** Tracy St., **$25,450;** Hutchins St., **$64,852;** plans imprv. Stark Rd., **$35,160;** Edwards Ave., **$127,612;** Jacobs Rd., **$226,810;** Milton Rd., **$70,000;** Roberts Island Rd., **$50,000;** Muller Rd., **$20,000;** Byron Rd., **$35,000;** Grant Line Rd., **$60,000;** Kettleman Lane, **$45,000;** Mariposa Rd., **$124,888;** Mathews Rd., **$50,000;** Alpine Rd., south, **$75,000;** Alpine Rd., north, **$80,683;** Jack Tone Rd., **$300,000;** River Rd., **$25,000;** 8 St., **$45,000;** Alpine Ave., **$90,000.** Financing not provided. J. B. Manthey, Court House, engr. CD 2/8—ENR 2/22.

Ill., East Peoria (br. Peoria)—City, City Hall, plans 75% completed 8 blocks concrete pavement, 32 ft. wide, in East Peoria Heights, **$40,000.** E. Fitzgerald, County Bldg., Pekin, consult. engr. CD 7/20—ENR 8/10.

Ill., Pekin—City, City Hall, plans 10% completed paving N. Second St., rerouting Rte. 29, through town, **$146,000;** resurfacing, new curbing, **$31,000;** plans 50% completed curbing, guttering, concrete widening Derby and 14 Sts., from 20 to 36 ft. concrete, **$90,000;** plans completed realignment S. Second St., **$16,000.** Financing not provided. E. Fitzgerald, County Bldg., city engr.

Ill., Pekin—City, City Hall, resurfacing 15 mi. brick streets, **$144,000;** 8 mi. black top streets with stabilized gravel base, concrete curb and gutter, **$50,000;** 8 mi. concrete pavement, **$200,000;** combination concrete curb and gutter, **$100,000.** E. Fitzgerald, County Bldg., city engr.

Ill., Pekin—Tazewell Co., Court House, plans completed grading, graveling, culverts and bridge on Sect. 9-1, M.F.T. **$80,000;** black top, Sect. 9, M.F.T., **$35,000.** Financing not provided. E. Mitchell, Court House, co. supt. hys.

Minn., Albert Lea—Freeborn Co., Albert Lea, plans 20% completed grading S.A. 7, **$50,000;** S.A.R. 17, **$35,000;** plans grading S.A.R. 11 and 15, **$55,000.** A. Pless, Albert Lea, co. hy. engr.

Minn., Alexandria—City, City Hall, street imprv. **$442,461.** C. I. Erickson, Alexandria, consult. engr.

★**Minn., Alexandria**—Douglas Co., Alexandria, plans 26% completed grading, bituminous surfacing, bridges and railroad crossing signals, **$713,473.** C. I. Erickson, Alexandria, co. hy. engr.

Minn., Baudette—Lake of the Woods Co., Baudette, plans 40% completed grading, gravel surfacing, **$54,000;** plans 60% completed grading, gravel surfacing, **$36,000;** plans completed, grading, gravel surfacing, **$30,000.** Land rights not cleared. M. M. Nygaard, Baudette, engr.

Minn., Cambridge—Isanti Co., Cambridge, plans 15% completed road imprvs. **$300,000.** Land rights not cleared, financing not provided. C. Van Loon, Cambridge, co. hy. engr.

Minn., Foley—Benton Co., Foley, plans 50% completed 40 mi. grading, 30 mi. base and bituminous surfacing. **$350,000.** H. G. Elletson, Foley, co. hy. engr.

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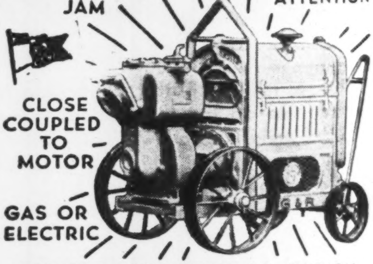
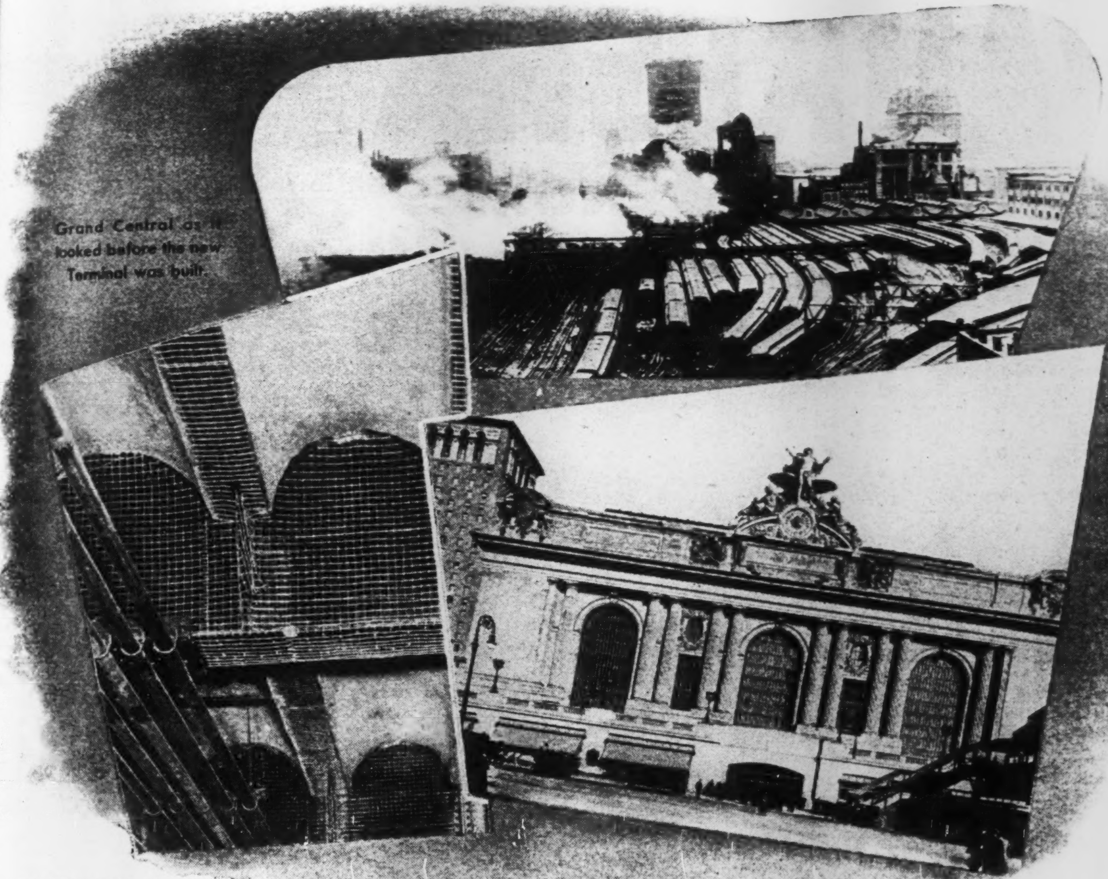
HOLDS PRIME
REQUIRES LITTLE ATTENTION



CLOSE COUPLED TO MOTOR
GAS OR ELECTRIC

RUGGED SIMPLICITY OF DESIGN ELIMINATES RECIRCULATION—DELIVERS GREATER VOLUME PER GAL. OF GAS
CAPACITIES UP TO 125,000 GPH
The GORMAN-RUPP CO. Mansfield, Ohio
GORMAN-RUPP
Self-Priming Centrifugal Pumps



Grand Central as it looked before the new Terminal was built.

How Clinton Welded Fabric was used for wrapping of structural steel.

Grand Central Terminal as it looked in 1913.

How a transportation problem was blasted out of old New York

By the turn of the century the old Grand Central Station could no longer accommodate New York's traffic. Expansion was essential—but realty values were high, so they decided to build 67 tracks on two levels. This necessitated the blasting and removal of over 3 million cubic yards of rock—of building a structure that would stand vibration, and the tremendous weight of Park Avenue's hotels and apartments.

In the building of Grand Central Terminal 1,300,000 sq. ft. of Clinton Electrically Welded Fabric were used for wrapping beams, girders and steel substructure. And ever since 1902, when Clinton Welded Fabric was invented, this strong, uniform fabric has been used in the reinforcement of thousands of buildings, bridges, sewers and streets.

Clinton Welded Fabric is characterized by perfect wire and welds, high uniform tensile strength, and freedom from ties and clips. It is available in a wide range of styles, both in gauge and spacing. It comes in sheets or rolls cut to your exact specifications, thus saving time and expense on the job. On your next concrete reinforcement job specify Clinton Fabric—the choice of many leading contractors and engineers.

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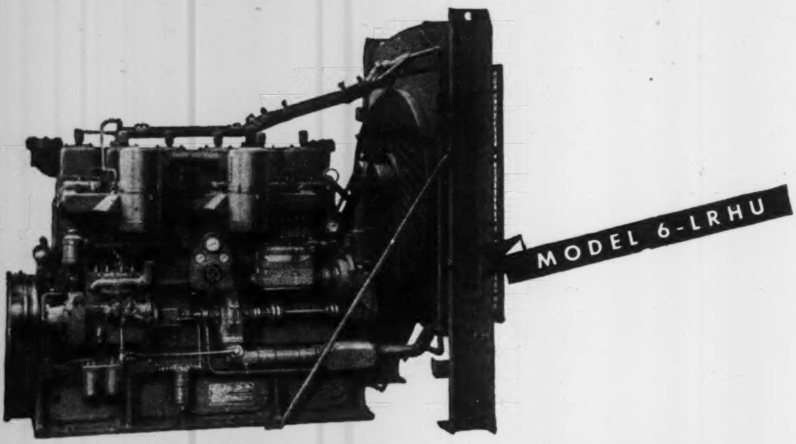
500 FIFTH AVENUE, NEW YORK (18), N. Y.

Abilene • Boston • Buffalo • Chattanooga • Chicago • Clinton (Mass.) • Detroit • Houston • Los Angeles • Philadelphia • San Francisco • Tulsa • Worce

WAUKESHA
HESSELMAN Oil ENGINES



● In wartime every Waukesha Engine is a war-work engine. All Waukesha production is for the use of the armed forces. Until the war is won, Waukesha postwar engine designs are not being shown.

But peacetime models are on the way. New advantages and greater user conveniences will make the new peacetime Waukesha-Hesselman *the world's most wanted diesel-oil engine.*

After the war the fuel problem for engine-driven equipment will be serious *unless it is Hesselman powered.* Because it burns those widely sold Nos. 1, 2 or 3 domestic furnace oils as well as high-speed diesel fuels...either high or low cetane...Hesselman will be the contractor's first choice for country-wide use. And a Hesselman may be converted from fuel injection to carbureted gas or gasoline without changing a single major part. *No compression ignition Diesel can be converted from fuel oil to gas or gasoline so quickly, or easily.* Even gasoline injection is possible with the Hesselman.

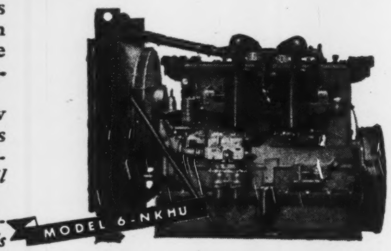
And Hesselman's *electric and positively timed ignition* and lower pressures give easier starting, less shock load, longer life, lower upkeep than with any other diesel-oil engine.

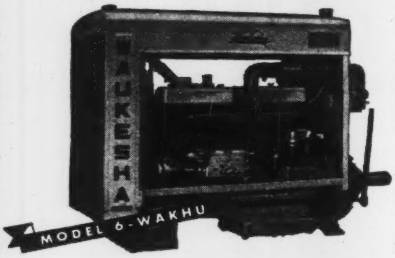
For your future engine needs, consult Waukesha now. Get Bulletin 1341.

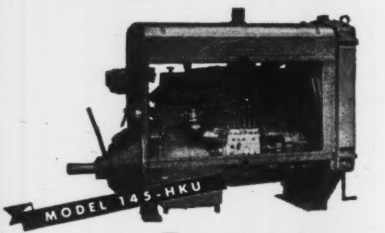
Power Unit Model	No. of Cyls.	Bore and Stroke, In.	Displ. Cu. In.	Speed RPM
*130-HLU	4	4 x 5	251	1000-2000
*VRZHU	4	4⅝ x 5¼	353	1000-1600
*140-HKU	6	4½ x 5½	525	1000-1800
*145-HKU	6	5¼ x 6	779	1000-1800
6-WAKHU	6	6¼ x 6½	1197	800-1600
6-NKHU	6	7 x 8½	1962	750-1200
6-LRHU	6	8½ x 8½	2894	750-1200

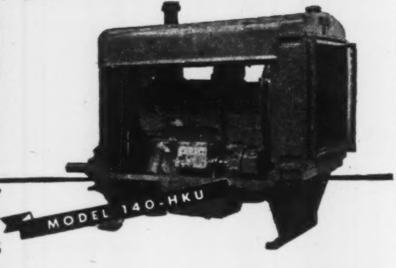
*These Hesselman Engines are true *multi-fuel engines,* and can be converted to burn natural gas or gasoline, with no internal changes. The others can also be converted provided manifolds for carbureted fuels are applied.

WAUKESHA MOTOR COMPANY
WAUKESHA, WISCONSIN
NEW YORK • TULSA • LOS ANGELES









POSTWAR PROJECTS (Cont'd.)

Minn., Grand Marais — Cook Co., Grand Marais, plans 75% completed grading, soil stabilization and bituminous surfacing 11.1 mi. Forest Hy. 5 (Gunflint Trail) from Grand Marais and north, **$132,000.** J. R. MacQueen, Grand Marais, engr.

Minn., Ivanhoe.— Lincoln Co., Ivanhoe, plans 90% completed grading, gravel, stabilization low cost bituminous. $150,000. Land rights not cleared. C. Zehner, Ivanhoe, engr.

Minn., Le Center—Le Sueur Co. Hy. Dpt., Le Center, plans completed highway construction. **$100,000.** $50,000 now available. E. P. Meyer, Le Center, engr.

Minn., Little Falls—Morrison Co. Court House, plans 75% completed road grading and temp. surfacing 20 mi. $100,000.

Minn., Minneapolis—Hennepin Co., A. P. Erickson, aud., highway construction, **$300,000.** Financing not provided. W. E. Duckett, co. hy. engr.

Minn., Olivia—Renville Co., Olivia, road construction, 1 highway bldg. $150,000. W. Pullen, co. engr.

Minn., Osakis—Village, street imprvs. **$81,544.** C. I. Erickson, Alexandria, consult. engr.

Minn., Park Rapids—Hubbard Co., Park Rapids, plans 30% completed 10 county wide road jobs, consisting of 10% of county road sys. of 518 miles. T. R. Day, co. engr.

Minn., Pipestone — Pipestone Co., Pipestone, plans 85% completed grading 130,000 cu. yd. State Aid Roads. **$30,000.**

Minn., Redwood Falls—Redwood Co. Hy. Dpt., Court House, plans 60% completed, grading, graveling 10 mi. State Aid Rd 1, **$68,925;** plans 60% completed 4 mi. State Aid Rd. 7, **$30,700;** plans 25% completed 17 mi. State Aid Rd. 3, **$163,060;** plans 15% completed grading, stabilization and bituminous surfacing 2.6 mi. State Aid Rd. 1, **$61,796.** W. P. Huber, co. hy. engr.

Minn., Red Wing—Goodhue Co., Red Wing, reconstructing 30 mi. State Aid Road and about 20 mi. new road construction with metal and monolithic culverts and 1 or 2 bridges. **$300,000.** E. M. Paulson, Red Wing, co. engr.

Minn., Stillwater—Washington Co., Stillwater, grading, graveling, low cost bituminous surface 11 mi. State Aid Rd. 11, **$139,000;** 5 mi. Bayport-Trunk Highway N-212 connection, **$94,000.** Land rights not cleared, financing not provided. J. G. Merten, Stillwater, co. hy. engr.

Ore., Hood River—Hood River Co., Hood River, plans 90% completed bituminous macadam paving 50 mi. county road sys., on 5 year plan, **$300,000.** Financing not provided. C. M. Hurlburt, co. engr. CD 6/19—ENR 7/13.

★**Ore., Klamath Falls**—Klamath Co., Klamath Falls, plans 40% completed grading, surfacing roads incl. gravel and oiled roads. **$500,000.** W. M. Hector, Klamath Falls, co engr.

★**Ore., Portland**—Multnomah Co., 601 Court House, Portland, plans under way paving, widening present paved roads, **$1,260,000;** surfacing secondary roads, **$1,160,000;** new road construction, reconstructing existing roads, **$804,000.** G. W. Buck, co. engr. Financing available.

Tex., Freeport—City, City Hall, plans under way street paving. **$150,000** bond election Mar. 24 for same. C. P. Smith, Orange, engr.

Va., Richmond — Henrico Co., Box 3-V, Richmond, plans 90% completed realignment, widening, grading roads, new construction, **$120,000.** Financing provided. T. Ellett, co. engr.

Wash., Aberdeen—City, City Hall, imprv. Hys. 9 and 13 within city limits. **$186,000.** Financing not provided. N. J. Salmon, City Hall, city engr.

READY FOR BIDS

Washington—State Hy. Dpt., C. E. Hickey, dir., Olympia, plans completed imprv. Sacheen cut-off around Davis Lake, in Newport, Pend Oreille Co. **$75,000.** Financing provided.

Wash., Ritzville—Adams Co., Ritzville, plans completed imprv. 2 sections roads. **$55,000.** W. W. Athey, co. road engr.

Ready for Bids

Of $17,000,000,000 of proposed postwar construction at beginning of 1915 only $550,000,000 was reported "ready for bids", plans complete and financing available.

If you have projects "ready for bids", please send them in to be added to the total above to give a measure of the materials that will be needed to relax restrictions and go ahead with civilian work.

Send ready-for-bids projects news to Elsie Eaves, Manager Business News Department, Engineering News-Record, 330 W. 42 St., New York 18, N. Y.

ASBESTOS IN ACTION
HIGH, WIDE and HANDSOME !

Designed, built and erected by Byrne Doors, Inc., Detroit. Apac Sheathing installed by the Faulkner Construction Company. (Official U. S. Navy photograph.)

. . . and SAFE because it's sheathed with *"Century"* APAC

THE striking architecture of this Navy Blimp hangar is its own tribute! The doors are like skyscrapers . . . 120 feet high . . . 220 feet wide . . . weighing 300 tons. And they must open the entire width of the hangar in TWO MINUTES.

These giant portals must be the masters of wind and weather—for failure to open and close quickly might spell the doom of a wind-tossed Blimp. So they are completely sheathed with "Century" Apac—K&M's low cost asbestos-cement sheet material. It is rot-proof, rust-proof and fire-resistant.

In thousands of industrial plants, K&M "Century" Apac is used for roofing and siding, office paneling, sheathing in machine shops and stock rooms, linings for elevator casings and shower stalls. It is ideal for new construction, repairs or plant additions.

Enormous quantities of "Century" Apac have gone into wartime jobs. YET NOW THERE'S PLENTY AVAILABLE FOR YOUR INDUSTRIAL CONSTRUCTION WORK . . . without delay, without restrictions.

heck these *"Century"* AC advantages for con- ction and renovation work

Made of Asbestos Fibre and Portland Cement
2. Pleasing light gray color
3. Fire resistant and durable
4. Convenient size—4' x 8', 4' x 9' and 4' x 10'. (Three thicknesses—3/16", 1/4" and 3/8".)
5. Low cost
6. Rat and termite proof
7. Easy to cut, handle and apply
8. Fastens with nails or screws
9. Practically no maintenance required
10. Prompt delivery

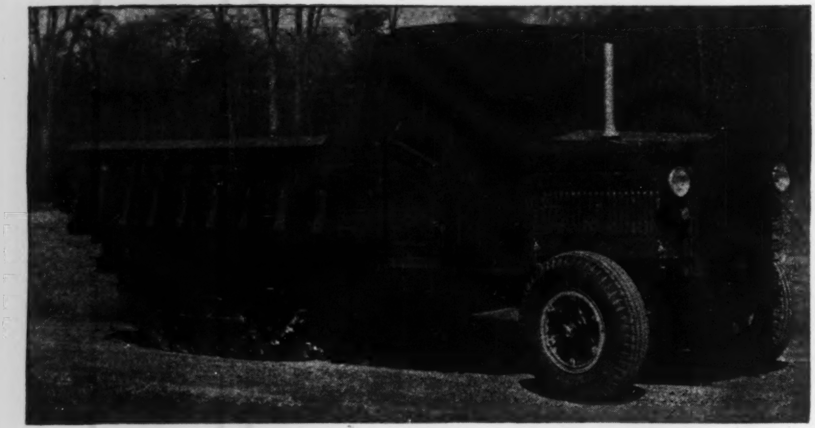
ARMY E NAVY

K&M best in asbestos

ature made Asbestos

y & Mattison have been making it mankind since 1873 . . . with products entury" Apac, "Century" Asbestos Cor- and Flat Lumber, Ebonized Asbestos, Temperature Insulations and others. ed in modern Asbestos and Magnesia ls? Write!

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA



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Result In Maximum
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Where grades are steep
and snow is deep

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TRACTORS AND TRACK TRAILERS 5 TO 50 TONS CAPACITY

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MORRIS, NEW YORK

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OPEN STEEL FLOORING
MAXIMUM OPENINGS
MINIMUM WEIGHT
LOCKED IN STRENGTH

For strength and simplicity, only two parts are used — bearing bars which carry the load and have curved slots punched ABOVE THE NEUTRAL AXIS, and cross bars, of the same cross sectional area as the slot itself, pressed into these slots to distribute the load. No rivets, bolts or welds are required, thus eliminating the possibility of loose joints. Tri-Lok flooring comes in rectangular, diagonal and U shapes with Safety Steps — ask for Bulletin 1140 — DRAVO CORPORATION, NATIONAL DEPARTMENT, 300 Penn Avenue, Pittsburgh (22), Pa. (Distributor for THE TRI-LOK COMPANY)

DRAVO

POSTWAR PR CTS (Cont'd

CONTRACTS AWARDED

Ore., Roseburg—Douglas Co.,
oiling 100 mi. roads, crushing 75
top surfacing, repairing 300 bri
ing and filling [illegible] bridges usi
box and girder span bridges,
$400,000. F. C. Frear, Roseburg
master.

EARTHWORK, WATE

PROPOSED WORK

★ **†Connecticut**—U. S. Eng., 81
Trust Bldg., Providence, R.
Natchaug River, Mansfield Hol
field; Hop River, in Andover;
River, South Coventry, **$7,600,000.**
not provided. CD 1/24—ENR
Mansfield.

★ **†Massachusetts** — U. S. En
dustrial Trust Bldg., Provide
flood control, dams and reservo
Brookfield, **$2,320,000;** in Barre
Barre, **$1,025,000;** in East
$950,000. Financing not provide

★ **†Wash., Mabton**—Dpt. Interio
Indian Affairs, 4160 Inter
Wash. 25, D. C., Satus unit 2, W
ject, involving highline canal
plant, **$750,000.** Financing not p

PLANS UNDER WAY

N. J., Belleville—Town, Town
under way retaining walls alo
River. **$65,000.** Financing ava
Welsh, Town Hall, engr. CD
ENR 12/9/43.

Tex., Fort Worth—City, S. H.
mgr., City Hall, plans under wa
sys., 2 mi. main open line an
$100,000. Financing available.

Tex., Freeport—City, plans
drainage. **$100,000** bond electio
for same. C. P. Smith, Orange,

★ **Tex., Galveston**—Galveston C
Robinson, judge, Court Ho
steel, concrete seawall westwar
or more; breakwater project, ove
Financing not provided. C. C. W
Court House, co. engr. CD 4/3
5/6/43.

LATIN AMERICA

B. W. I., Kingston—Municipality
ton, Jamaica, plans imprv. gas
installing new equip. $200,000.

PUBLIC BUILDING

PROPOSED WORK

★ **†Calif., Fresno**—Fresno Co., Co
library, **$500,000.**

★ **Calif., Oakland**—City, City
election May 8, Hall of Justic
lice administration bldg., $2,707,
library and 4 branches, $1,763,500
2/28—ENR 2/22, 3/8.

Calif., Springville—Tulare C
House, Visalia, construction at
Kings County Tuberculosis Sanator
000.

★ **Calif., Visalia**—Tulare Co., Co
courthouse addn., **$500,000;**
people's home, **$100,000.**

★ **Conn., Deep River**—Town of D
et al, Bd. Selectmen, Town
River, Regional High School, ser
River, Haddam, Chester, Essex an
worth, **$500,000.** Land rights no
financing not provided.

Conn., Hartford—State Comptro
fice, State Office Bldg., institution
farm for inebriates. $250,000. Fina
provided.

Conn., Newington—Town, Supt.
1223 Main St., brick, steel school,
2 story, bsmnt., brick, steel hig
Cedar St., **$250,000.** Financing not

★ **D. C., Wash.**—District Comrs.,
Bldg., branch library at 18 St.
Hope Rd., **$187,500;** at Fairmont
tween Georgia and Sherman Aves.,
near 12 Ave. and Michigan Ave.
Minnesota Ave. and Ely St., $156,2
ity Wisconsin Ave. and Alber
$156,250. Financing not provided.

★ **D. C., Wash.**—District Comrs.,
Bldg., pediatrics bldg., $627,70
tory, **$191,000,** both at Gallinger
Hospital. Financing provided.

★ **Idaho, Boise**—School bd., Dr.
ver, pres., Boise, $1,535,000 bon
May 22, 2 school bldgs., addn. to 3
modernization other bldgs.

★ **Ill., Pekin**—City, City Hall,
bldg., **$150,000;** city hall, $400,

Ill., Pekin—Dist. 303, Pekin, 3
school addn. **$200,000.** Financing
vided.

Me., Augusta — State Bd. D
House, bldg. for State Forest Pro
Industrial Research, Approx. $150,

XPLOSIVES Are Tools . . .

The Right Choice . . . Properly Handled . . . Gets the Most From the Job

Picking an explosive is like choosing the right tool from the kit—both call for a consideration of job requirements.

Atlas makes over 120 kinds and grades of explosives, many of them in different sizes and types of packing.

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HIGH DENSITY

EXTRAS
Str. 15%-60%
Vel. 7300-12,000
Den. 105

APEX
Str. 20%-70%
Vel. 9000-19,000
Den. 115

Stumping Expl.
Str. 15%-50%
Vel. 7800
Den. 103-117

FREE FLOWING

FLO-DYNS
Str. 10%-65%
Vel. 4600-5400
Bag Packed

Quarry Specials
Str. 20%-65%
Vel. 4000-5500
Bag Packed

LOW DENSITY

AMODYNS
Str. 65%
Vel. 5800-10,000
Den. 118-173

Stumping Expl.
Str. 30%-65%
Vel. 7400-9000
Den. 133-165

APCODYNS
Str. 65%
Vel. 7000-9000
Den. 128-180

PERMISSIBLE

COALITES
Str. 55%-60%
Vel. 6000-10,000
Den. 133-244

APCOLS
Str. 60%
Vel. 4500-7000
Den. 133-178

ITROGLYCERINE DYNAMITES

FARMEX Ditch.
Str. 50%
Vel. 18,000
Den. 103-108

Nitroglycerine Dyn.
Str. 20%-60%
Vel. 8800-19,000
Den. 105

GELATINS

PERMISSIBLE

GEL-COALITES
Str. 35%-60%
Vel. 8200-16,400
Den. 97-107

AMMONIA

GIANT
Str. 30%-90%
Vel. 7000-20,000
Den. 85-100

PETROGEL
Str. 60%
Vel. 18,000
Large Cartridges

NITROGLYCERINE

ATLAS
Str. 20%-100%
Vel. 6500-20,000
Den. 85-100

Blasting Gel.
Str. 100%
Vel. 20,000
Large Cartridges

Oil Well Expl.
Str. 80%-100%
Vel. 20,000
Large Cartridges

PETROGEL H. V.
Str. 60%-100%
Vel.18,000-20,000
Large Cartridges

EMI-GELATINS

PERMISSIBLE

GEL-COALITES
Str. 55%-60%
Vel. 5900-12,000
Den. 120

AMMONIA

GELODYNS
Str. 65%
Vel.10,000-11,000
Den. 110-128

Str. % Strength.
Vel. Velocity of detonation, feet per second, in the open 1¼" x 8".
Den. Minimum number 1¼" x 8" cartridges per 50-lb. case.

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ATLAS POWDER COMPANY
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POWER WHENEVER and WHEREVER YOU WANT IT

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICHIGAN

POSTWAR PROJECTS (Cont'

Me., Sanford—Town, Bd. Sel Hall, war memorial, incl. au gymnasium units, community high school. $150,000. Financ vided. CD 12 [illegible] 43—ENR 1/12/

Me., Strong—Town, Bd. Sele Hall, high school, incl. gymnasi Financing not provided.

Mass., Amherst — Town, B Town Hall, school. To exceed

Mass., East Bridgewater— Schools, East Bridgewater, school. **$150,000.** Financing

Mass., Ludlow — Town, B Town Hall, 2 story brick, stee addn. **$150,000.** Financing not p

Mass., Marblehead—Town, B Town Hall, combined fire and tion. To exceed $150,000.

Mass., Millbury—Town, Bd. Town Hall, Senior High Sc **$150,000.** Financing not provid

Mass., Montague—Town Su Town Hall, high school, to exc

Mass., Montague—Town Bd. Town Hall, town hall and com ter, auditorium, etc. $150,000, not provided.

Mass., West Bridgewater—T Dpt., West Bridgewater, brick, Senior High School, $200,000. F provided.

Mass., Ware—Town, L. B. Ca Bldg. Comrs., Ware Savings high school. To exceed $150,000.

★**Minn., Alexandria** — City, expan. electric generation pla

★**Mo., Clayton**—St. Louis Co., Clayton, St. Louis, Zone 5, $4 election May 15, construction, courthouse and war memorial 2,000-seat auditorium. CD 3/12-

★**N. Y., Brooklyn**—Dpt. Park seums & Institutions, Ar Central Park, 64 St. and 5 Ave., reconstructing bldgs., New Ame and addns. to Wings B & C, Institute of Arts & Sciences, seum, Proj. PV-235. $1,085,000. —ENR 2/4/43.

N. Y., Buffalo—Dpt. P. Wks., fice Bldg., Albany, Zone 1, libra Teachers College, for Education cation Bldg., Albany. $355,500.

★**N. Y., Concord**—Central Sch Concord, Junior-Senior H incl. school bus garage and ment for towns of Concord; Sa Collins. **$520,000.** State Ai Funds allotted.

★**N. Y., Franklin Square** — School Dist. 17, Franklin Squa tary and Junior High School, $64 Aid Planning Funds allotted.

N. Y., Glens Falls—City, City house and repair shop. $60,000. Planning Funds allotted.

N. Y., Grand Island—Town, Sidway School and Bus Garage **600.** State Aid Planning Funds

N. Y., Hempstead—U. F. Schoo Hempstead, Gotham Ave. school of Hempstead and village o **$411,800.** State Aid Planning Fun

N. Y., Malone—Comrs. Fra Malone, Highway Dpt. Shop a **$50,000.** State Aid Planning F ted.

★**N. Y., Oswego**—Dpt. P. Wks., fice Bldg., Albany, Zone 1, ph cation and health bldg., incl. hea gymnasium, **$722,800;** Campus Practice, **$473,445;** industrial addn., **$215,680,** all at State Tea lege, for Education Dpt., Educat Albany.

N. Y., Plattsburg—Comrs. Ci Plattsburg, office bldg. $241,000. Planning Funds allotted.

★**N. Y., Syracuse**—Dpt. P. W Office Bldg., Albany, Zone 1, w ucts laboratory, **$382,700;** paper a laboratory addn., **$361,400,** at N State College of Forestry, for Dpt., Education Bldg., Albany.

★**N. C., New Bern**—State Dpt. tion & Development, Raleigh, tion of Gov. Tryons Palace. T **$750,000.**

★**O., Barberton**—Barberton City Co., Barberton, hospital, T Park, **$500,000.**

★**O., Cleveland** — Cleveland Lib City Hall, 3 story, ultra-heavy tion library addn., on open court a Hall. **$500,000.**

★**S. C., Charleston**—Charleston C culosis Assn., Old Citadel, C tuberculosis sanitorium, $600,000.

Tex., Austin—State, C. Stevens Austin, bldg. for delinquent ne **$150,000.** Financing not provided.

★**Tex., Dallas**—State, G. Stevens Austin, cancer treatment **$500,000;** pellagra treatment **$500,000;** physchopathic hospital, Financing not provided.

If your community owns its water supply system and installs pipe bearing a mark like this, CAST Q IRON you and your fellow taxpayers should be gratified because that mark identifies cast iron pipe, known as "Public Tax Saver No. 1."

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the ground for 100 years, serving
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t bears this mark CAST Q IRON
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POSTWAR PROJECTS (Cont'd.)

★**Tex., Fort Worth**—Fort Worth Independent School Dist., Fort Worth, defeated bond issue, school bldgs., facilities, **$2,500,000.** CD 8/2—ENR 8/24.

Tex., Grand Prairie—Grand Prairie Public School Bd., Grand Prairie, bond election Mar. 31, Junior High School, **$200,000**; school unit, **$150,000.** CD 12/27—ENR 1/11.

Tex., Paris—City, J. Barnes, mayor, City Hall, community center. **$150,000.** Financing not provided.

Tex., Rockport—Rockport Ind. School Dist., Rockport, gymnasium, shop, etc. Over **$75,000.** Financing not provided.

Wash., Colfax—School Bd., Colfax, voted $334,358 bonds 2 schools, **$150,000** each, and high school, **$250,000.** CD 2/14—ENR 3/8.

★**Wash., Ephrata**—Grant Co. Housing Auth., Ephrata, 250 housing units. **$1,000,000.** Financing not provided.

★**Wash., Port Orchard**—Port Orchard Housing Auth., Port Orchard, 134 housing units. **$600,000.** Financing not provided.

★**Wash., Seattle**—University of Washington, E. 42 St. and 15 Ave. N.E., Zone 5, musical bldg. **$600,000.** Financing not provided.

Wash., Woodland—School Bd., H. L. Jacobs, supt., defeated bonds school. **$300,000.** CD 3/5—ENR 3/22.

★†**Wis., Milwaukee**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago, Ill., 120-140 war housing units. **$750,000.** Financing available. Land rights not cleared.

Sask., Saskatoon—Bd. Educ., Saskatoon, exten. Technical Collegiate Institute, **$150,000.**

PLANS UNDER WAY

★**Calif., Salinas** — Monterey Co., Court House, Salinas, county hospital addns., incl. boiler room, laundry, **$180,000**; isolation ward, **$110,000**; obstetrical unit, **$85,000**; administration clinic, laboratory, **$125,000**; children's unit surgery and kitchen, **$115,000**; jail addns., incl. new cell block, **$86,000**; women's quarters, **$90,000.** H. F. Cozzens, Court House, engr.

Calif., Salinas—Salinas School Dist., c/o Supt. Schools, Salinas National Bank Bldg., plans by C. E. Butner, 7 Minham St., Salinas High School addn. **$247,000.**

Calif., Stockton—San Joaquin Co., Court House, plans under way office bldg., **$153,000**; prison camp, **$50,000.** Financing provided. J. B. Manthey, Court House, engr.

Calif., Ukiah—Mendocino Co., Court House plans by C. Caulkins, Rosenberg Bldg., Santa Rosa, rein.-con. jail and courthouse, **$250,000**; rein.-con. hospital and tuberculosis hospital and detention home, **$200,000.** CD 3/12—ENR 3/22.

Calif., Weaverville—Trinity Co., Court House, plans by O. Deichmann, 1026 Market St., San Francisco, court house annex, **$100,000**; hospital, **$80,000.**

Fla., Jacksonville—Duval Co., Jacksonville, plans 75% completed by J. D. Powell, Atlantic National Bank Bldg., court house for juveniles, incl. 4 story structure with court room, judges quarters, general offices, hospital rooms, detention quarters, kitchen, dining room, dormitories and bedrooms and bsmnt. with laundry and play rooms, **$300,000.** Financing provided. A. Colee, Jacksonville co. engr. CD 2/10/43—ENR 2/18/43.

Ill., Bloomington—Bd. Educ., Dist 87, Bloomington, plans 50% completed by Shaeffer & Hooton, People's Bank Bldg., 2 story, bsmnt., brick high school addn., concrete fdn., serving as vocational addn. **$150,000.**

★**Ill., Chicago**—City Bd. Educ., 228 N. LaSalle St., preliminary plans by J. C. Christensen, 228 N. LaSalle St., 3 story high school, at 108 and Ave. H, **$1,250,000**; 2 story, school, 72 and State Sts., **$180,000**; 3 story, brick, concrete, steel, masonry school, 57 and Lafayette Sts., **$400,000**; 3 story, Ogden Elementary School, Dearborn and Polk Sts., **$350,000**; Hawthorne Elementary School addn., **$480,000**; Yale Elementary School, 7010 Yale Ave., **$260,000**; Burroughs Elementary School, Sacramento Ave. and 36 St., **$235,000.** Financing not provided.

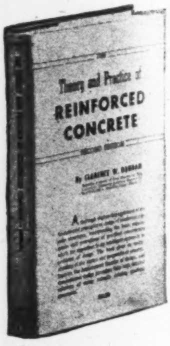
Ill., Normal—School Dist. 348, Normal Community High School, plans completed by Lundeen & Hilfinger, 603 Corn Belt Bank Bldg., Bloomington, 3 story, brick high school annex, concrete fdn. $250,000-$300,000. Financing not provided.

★**Ia., Davenport**—Scott Co., Court House, court house, **$1,000,000.** J. M. Malley, Court House, co. engr.

Kan., Winfield—City, P. Frankenfeld, mgr., City Hall, plans by Overend & Boucher, Brown Bldg., Wichita, addn., and nurses home at Newton Memorial Hospital. **$300,000** bond election Apr. 3.

Mass., Wenham—Town Bd. Selectmen, Town Hall, preliminary plans by P. Horton Smith, Main St., concrete, brick school. **To exceed $150,000.**

★**Mich., Litchfield**—Litchfield Bd. Educ., Litchfield, plans by O'Dell, Hewlett & Luckenbach, 2317 Dime Bldg., Detroit, Elementary and Junior High Consolidated School. **$500,000.**



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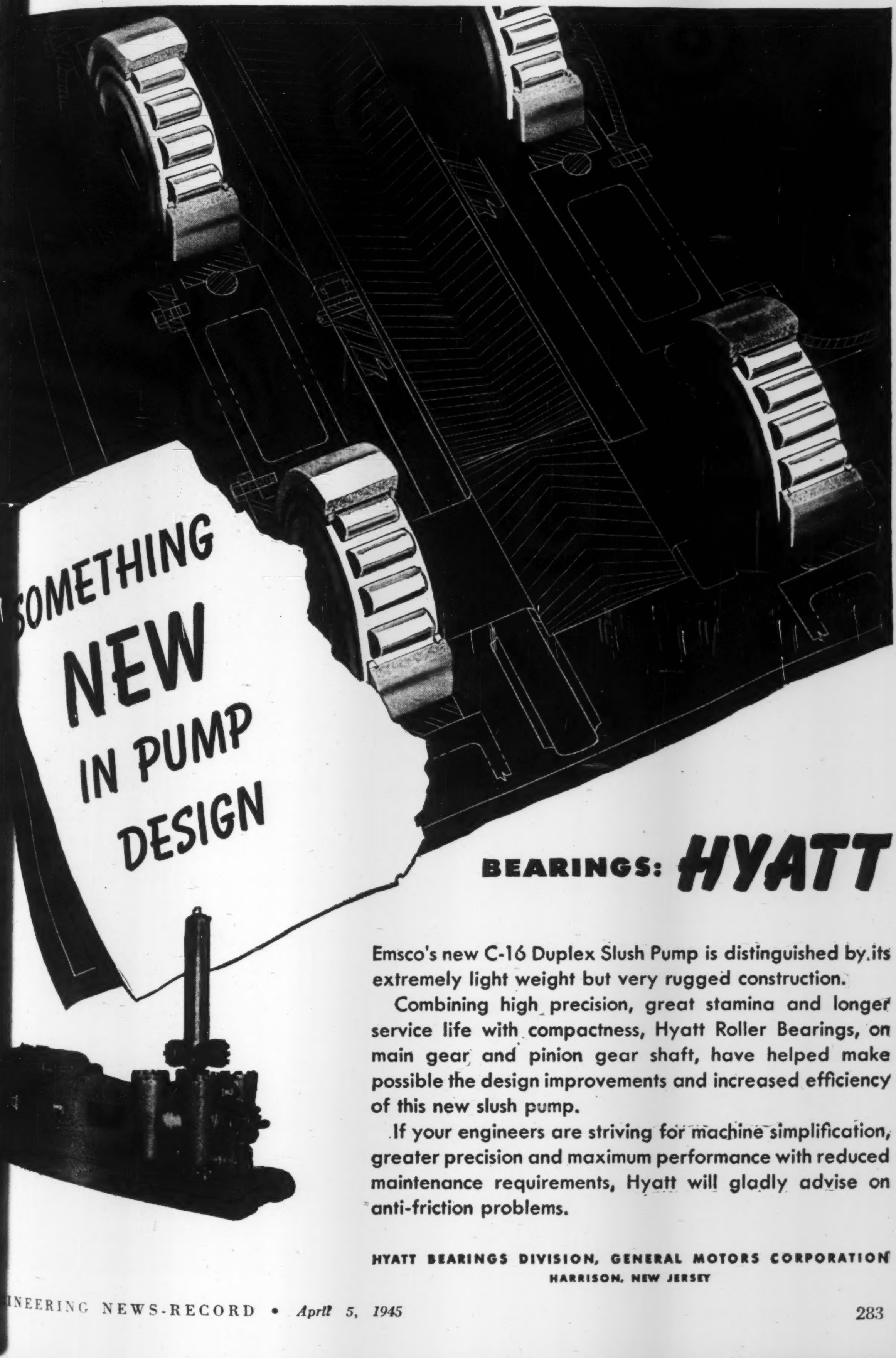
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- **Elimination of individual boiler worries.**
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POSTWAR PROJE (Cont'd)
Mich., Muskegon—Bd. Educ., M
plans by O'Dell, He & Lucken
troit, Orchard View School alterations
$300,000.

★**Mich., Whitehall**—Bd. Educ., W
plans by O'Dell, Hewlett & Luck
2317 Dime Bldg., Detroit, Elementa
Junior High Consolidated School.

Minn., Albert Lea—City, C. V. Jon
City Hall, plans by Tatz, King & D
Pioneer Bldg., St. Paul, city hall, $1

Minn., Breckenridge—Bd. Educ.,
Bronson, clk., plans by F. W. Jack
Cloud, 2 story, brick, stone schoo
$210,000. $50,000 bond election Apr.
same. C. M. Orr Engrg. Co., 1004 Ma
Ave., Minneapolis, consult. engr. C
ENR 6/15.

Minn., Red Wing—Bd. Educ., H. O
husen, clk., City Hall $700,000 bond
Apr. 23, high school addns., alte
grade school, auditorium-gymnasium
King & Day, 1509 Pioneer Bldg., S
archts. CD 8/24—ENR 9/7.

Minn., Willmar—City, c/o Light &
Comn., Willmar, making survey pow
imprvs., incl. bldg. changes, new
etc. **$125,000.** Pfeifer & Schultz, 7
ley Temple Bldg., Minneapolis,
engrs.

Mo., Gardenville (St. Louis, Zone 2
—Bayless Consolidated School Dist.
Louis Co., Mrs. Violet C. Bascom
schools, Senior High School Bldg.,
Rd. and Hildesheim Ave., St. Loui
23, plans by M. Boulicault, 1401 A
dor Bldg., 411 N. 7 St., St. Louis,
brick, concrete school on 18 acre tra
Weber Rd. Over **$150,000.** $142,00
voted.

★**Mo., St. Louis**—City, M. M.
pres. Bd. Pub. Serv., 304 City H
and Market Sts., Zone 1, plans by La
& Klein, 315 N. 7 St., Zone 1, aud
and vocation bldg., St. Louis T
School, Bellefontaine and Hall
$100,000; plans by Mackey & Murphy,
Hall, Washington University, Skink
Forsythe Blvds., city art museum
tions, etc., Forest Park, **$250,000;** p
H. K. Graf, 2825 Olive St., Zone
Station 31, near Morganford Rd. and
borough Ave., **$40,000;** plans by
Johnson, Mack & Van Hoefen, 70
St., Zone 1, Fire Station 38, near
Ave. and Chippewa St., **$55,000;** p
Mauran, Russell & Crowell & Mu
1620 Chemical Bldg., 8 and Oliv
Zone 1, Fire Station 40-41, near
and Delmar Blvd., **$120,000;** plans b
& Pauley, 3800 West Pine Blvd., Z
Fire Station 44, near Ivanhoe and
west Ave., **$40,000.** CD 8/14—ENR 9

N. Y., Albany—State Dpt. P. Wks.,
Office Bldg., Zone 1, plans by H. O.
ton, Albany, addn. for dramatics and
altering boiler house, at State Colle
Teachers, ED-34, for Education Dpt.
cation Bldg. **$257,000.** Financing no
vided. CD 10/27—ENR 11/16.

N. Y., Albion—Dpt. P. Wks., State
Bldg., Albany, Zone 1, plans comple
Kaelber & Waasdorp, Rochester, a
and gymnasium bldg., at Albion State
ing School, COR-10, for Dpt. Corr
State Office Bldg., Albany, Zone 1, $
Financing not provided. CD 3/3—EN

N. Y., Beacon—Dpt. P. Wks., State
Bldg., Albany, Zone 1, plans comple
Peterkin, Biezantz & Frazer Assoc.,
44 St., New York, Zone 18, addnl. h
etc., at Matteawan State Hospital, C
for Dpt. Correction, State Office Bld
bany, Zone 1. **$191,824.** Financing no
vided. CD 1/7—ENR 1/27.

N. Y., Binghamton—Dpt. P. Wks.
Office Bldg., Albany, Zone 1, plans co
pleted by Div. Architecture, C. J.
comr., Albany, storehouse, addn., alte
MH-12, at State Hospital for Dpt.
Hygiene, State Office Bldg., Albany, Z
$93,677. Financing not provided. CD
ENR 7/13.

★**N. Y., Binghamton**—Dpt. P. Wks.,
Office Bldg., Albany, Zone 1, pla
Conrad & Cummings, Binghamton, me
surgical bldg., for 780 patients at State
pital, MH-14, for Dpt. Mental Hygiene,
Office Bldg., Albany, Zone 1, $2.4
Financing not provided. CD 11/28—
12/14.

★**N. Y., Buffalo**—Dpt. P. Wks., State
Bldg., Albany, Zone 1, plans by Y
Sawyer, 101 Park Ave., New York, Zo
heating plant at State Hospital, M
for Dpt. Mental Hygiene, State Office
Albany, Zone 1, **$550,000.** Financing no
vided. CD 11/30—ENR 12/14.

N. Y., Canton—Dpt. P. Wks., State
Bldg., Albany, Zone 1, plans under w
J. M. Ryder, 122 Jay St., Schenectady,
economics bldg., at State Agricultu
Technical Institute, St. Lawrence Univ
ED-12, for Education Dpt., Education
Albany. **$340,000.** Financing not pro
CD 9/20—ENR 10/5.

★**N. Y., Cohoes**—Dpt. P. Wks., State
Bldg., Albany, Zone 1, plans under
power plant and dam on Mohawk
PW-5, **$1,500,000;** power plant on Cham
Canal, PW-3, **$1,000,000.** Financing not
vided. Div. Architecture, C. J. White,
State Office Bldg., Albany, Zone 1,
CD 10/27—ENR 11/16.

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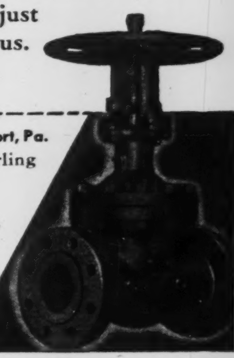

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POSTWAR PROJECTS (Cont'd.)

N. Y., Cortland—Dpt. P. Wks., State Bldg., Albany, Zone 1, plans by C. W. Cortland, library at State Teeachers C ED-36, for Education Dpt., Education Albany, **$225,000.** Financing not prov

★ **N. Y., Vischer Ferry**—Dpt. P. Wks., Office Bldg., Albany, Zone 1, plans way addnl. construction at Vischer and Crescent powerhouses, PW-2, Financing not provided. Div. Archite C. J. White, comr., State Office Bldg bany, Zone 1, engr. CD 11/2—ENR 1

★ **N. Y., Geneva**—Dpt. P. Wks., State Bldg., Albany, Zone 1, plans by White, Geneva, food research bldg., **$540,000;** central heating plant, ED-38, **000** at State Agricultural Experiment S for Education Dpt., Education Bldg., Al Financing not provided. CD 8/20/43— 8/26/43.

N. Y., Marcy—Dpt. P. Wks., State Bldg., Albany, Zone 1, plans by Shreve, & Harmon, 11 W. 44 St., New York, Zo children's group for 100 patients, MH- State Hospital, for Dpt. Mental Hy State Office Bldg., Albany, Zone 1. $37 Financing not provided. CD 11/30— 12/14.

★ **N. Y., Middletown**—Dpt. P. Wks., Office Bldg., Albany, Zone 1, pla Teller & Halverson, Kingston, dist bldg. for 640 male and female patient State Homepathic Hospital, MH-131, for Mental Hygiene, State Office Bldg., Al Zone 1. **$1,472,900.** Financing not prov CD 11/29—ENR 12/14.

N. Y. Morrisville—Dpt. P. Wks, Office Bldg., Albany, Zone 1, plans by Betz, Kingston, administration bldg., at Agricultural & Technical Institute, E for Education Dpt., Education Bldg., Alb **$155,000.** Financing not provided.

N. Y., New Dorp—Dpt. P. Wks., Muni Bldg., New York, Zone 7, plans by F Zurmuhler, 197 Clinton Ave., Richm Zone 1, 122nd Precinct Station House Police Dpt., 240 Centre St., New York, 13, Proj. PO-18. **$130,000.**

★ **N. Y., New York**—Port of New Authority, 111 8th Ave., Zone 11, p under way Union Midtown Bus Termina square block 200x800 ft., bounded b and 9 Aves., 40 and 41 Sts. **$13,000,** State Aid Planning Funds allotted. J. Evans, ch. engr., and R. Smiley, engr. design. CD 6/21—ENR 6/29.

N. Y., Potsdam—Dpt. P. Wks., State O Bldg., Albany, Zone 1, plans by A. F. bert, 358 Fifth Ave., New York, Zone health and physical education bldg., ED at State Teachers College, for Dpt. Educat Education Bldg., Albany. **$351,000.** Financ not provided. CD 8/24—ENR 9/7.

★ **N. Y., Poughkeepsie**—Dpt. P. Wks., S Office Bldg., Albany, Zone 1, plans Peterkin, Biesantz, Fraser Assoc., 36 W. St., New York, Zone 18, medical-surg bldg., for 960 patients at Hudson River St Hospital, MH-37, for Dpt. Mental Hygie State Office Bldg., Albany, Zone 1. **$2,637,** Financing not provided. CD 11/30—E 12/14.

★ **N. Y., Rome**—State Dpt. P. Wks., St Office Bldg., Albany, Zone 1, plans Bagg & Newkirk, Utica Gas & Elect Bldg., Utica, storehouse and cold stora bldg., MH-97, **$565,000;** medical-surgi bldg., for 270 patients MH-93, **$1,154,150,** Rome State School, or Dpt. Mental Hygie State Office Bldg., Albany, Zone 1. Financi not provided. CD 11/29—ENR 12/14.

★ **N. Y., Sonyea**—Dpt. P. Wks., State Of Bldg., Albany, Zone 1, plans by Cro Lewis & Wick, 200 5 Ave., New York, Zo 10, power plant and service connectio MH-26 at Craig Colony for Dpt. Ment Hygiene, State Office Bldg., Albany, Zone **$610,000.** Financing not provided. CD 11/ —ENR 12/14.

★ **N. Y., Syracuse**—Dpt. P. Wks., Sta Office Bldg., Albany, Zone 1, plans M. L. & H. A. King, Denison Bldg., medica surgical bldg., for 523 patients at Syracu State School, MH-136, for Dpt. Ment Hygiene, State Office Bldg., Albany, Zone **$1,714,000.** Financing not provided. C 11/29—ENR 12/14.

N. Y., Wassaic—Dpt. P. Wks., State Offic Bldg., Albany, Zone 1, plans under wa water supply sys, addn., at Wassaic Stat School, MH-200, for Dpt. Mental Hygiene State Office Bldg., Albany, Zone 1. **$50,00** Div. Architecture, C. J. White, comr., Stat Office Bldg., Albany, Zone 1, engr. CD 11/2 —ENR 12/14.

N. Y., Wassaic—Dpt. P. Wks., State Offic Bldg., Albany, Zone 1, plans completed by Alfred Hopkins & Assoc., 415 Lexington Ave., New York, infirmary bldg. addns. at Wassaic State School, MH-38, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1. **$237,700.** Financing not provided.

★ **N. Y., Wingdale**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by McKim, Mead & White, 101 Park Ave., New York, Zone 17, medical-surgical bldg., 99 patients, MH-29, **$2,915,000;** addnl. power plant facilities, MH-30, **$375,000;** 2 bldgs. for 800 disturbed patients, MH-33, **$2,070,000,** all at Harlem Valley Hospital for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1. Financing not provided. CD 11/30—ENR 12/14.

POWER PROVER helps save 250 to 315 gallons of gasolene a day in this fleet

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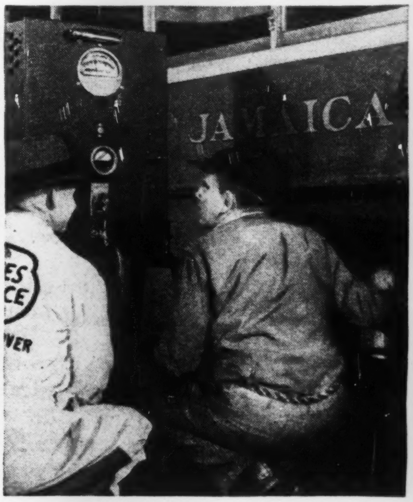
ica Buses, Inc., at 114-02 New York Blvd., Jamaica, L. I., operates 73 buses, serving Jamaica, Queens and Nassau.

"**My fleet runs right** . . . and I can prove it *scientifically* with the Cities Service POWER PROVER," says J. F. Weidner, General Maintenance Superintendent of Jamaica Buses, Inc. "It *eliminates* guesswork in tune-up. Tells *quickly* and *accurately* just *what* and *where* the trouble is. As a result we get better bus operation . . . less oil dilution . . . and save several hundred gallons of our strictly limited supply of gasolene every day."

of No. 1: After inserting hose of Cities vice Power Prover in exhaust outlet, Bill es, Power Prover Serviceman, points out a % *gasolene waste* to Bill Koestring, menic for Jamaica Buses, Inc.



Proof No. 2: Bill Koestring makes his tune-up adjustments as he watches the Power Prover dial. Accurately, quickly, the needle registers a gradual reduction in gasolene waste, as tune-up progresses.

Proof No. 3: Bill Koestring shows George Kletty, Garage Foreman for Jamaica Buses, Inc., just how he improved engine efficiency . . . and reduced gasolene waste from *42% to 18%—normal idling operation.*

Take Advantage of the Cities Service Power Prover for Your Own Fleet — NOW!

Mail in This Coupon *Today* for a *Free* Demonstration Test on Your Vehicles.

This offer is limited to principal cities in Cities Service marketing territories East of the Rockies.

CITIES SERVICE OILS
ONCE-ALWAYS

Cities Service Oil Company,
Room 269
70 Pine Street, New York 5, N. Y.

Gentlemen: I am interested in your offer of a FREE Demonstration Test of the Cities Service Power Prover on my fleet . . . *without obligation to me.*

Name ....

Address ....

No. of Vehicles in Fleet ....

JUST AS MUCH AT HOME "IN SERVICE"

Thor

GET THE TOUGH JOBS DONE... *Faster!*

Army Engineers dig for buried German mine somewhere in France

No. 25 PAVING BREAKER

Super heavy duty—84 pound—extra powerful—for tough, rough going under all conditions—A rugged four-bolt back head, Thor positive, short-travel, tubular valve and new Thor latch type retainer all exclusive features,) are standout reasons why Thor Breakers turn out low-cost, high efficiency work so consistently.

Contractors and builders swear by—not at—their Thor Paving Breakers. Construction men on the home front have found through long years of on-the-job experience that Thor equipment has the stamina and work capacity to get tough jobs done faster, better, more economically. Now, Army engineers are using the same Thor tools to do even harder and more urgent work under the most difficult conditions.

Thor Paving Breakers provide more power due to "measured air"—an exclusive Thor feature. Operators appreciate the easy handling that results from improved balance. Thor Paving Breakers are built from alloy-steel drop forgings. This assures strength, rigidity, longer life and lower operating costs. Everything you want in speed and power for breaking concrete you'll find in Thor equipment.

S THEY ARE IN SERVICE AT HOME

PAVING BREAKERS

Thor Contractors' tools sold by leading Construction Equipment Distributors Everywhere.

WHAT *Thor* "MEASURED AIR" MEANS TO YOU...

Balanced Power—because only a pre-ely governed quantity of air is allowed hind the piston.

Smooth Performance—because every roke is powered by the same measured uantity of air.

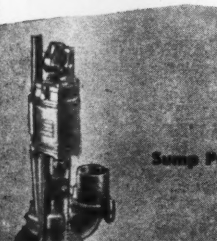
. Air Economy—because every ounce of ir which enters the machine provides a ull measure of maximum power for peak efficiency performance.

4. Low Maintenance Cost—because there are no separate parts of the patented Thor valve to become lost or wear out.

HOW THOR "MEASURED AIR" ECONOMY WORKS . . .

The shorter the travel, the more positive the action of the valve in admitting to the tool only the required amount of air—in instantly sealing the outlet against excess air.

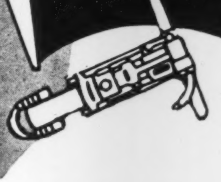
Short travel of the Thor Paving Breaker valve action powers each stroke of the tool with the same quantity of air. Elimination of excess air keeps out of the channel the overload of power that staggers the stroke and causes vibration.



Sump Pumps

Thor

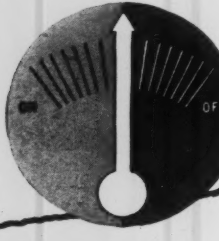
PORTABLE *Electric & Pneumatic* TOOLS



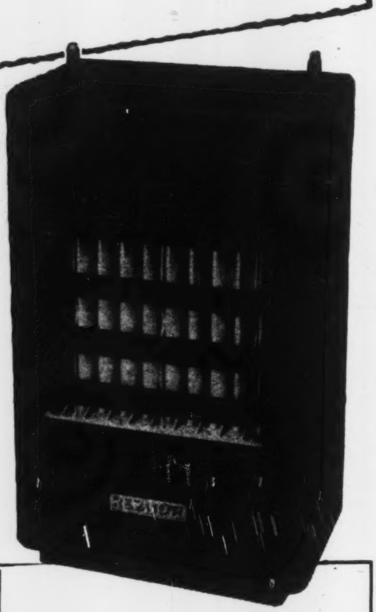
Branches in Principal Cities

For more detailed information about the powerful, easy-operating Thor Paving Breakers and other Thor contractors' air tools, write for Catalog 42-A.

INDEPENDENT PNEUMATIC TOOL CO.
600 W. Jackson Blvd., Chicago 6, Ill.
New York Los Angeles



"TURN IT ON—TURN IT OFF" TIME IS HERE AGAIN



EASY AS 1-2-3 WITH A REZNOR UNIT HEATER

Cold today, warm tomorrow. Now you want heat, now you don't. Central heating systems do not turn off or on at will. For intermittent operation, large heating plants not only are inefficient but costly and unsatisfactory.

You can turn on a Gas-Fired Reznor and start a flow of heat or turn it off and stop the flow . . . all in a matter of seconds. Used in large plants and small as auxiliary heat or as the primary source, Reznor Unit Heaters can be suspended or placed on the floor. You are always in tune with the heating season with Reznor Unit Heaters. **REZNOR IS THE OLDEST NAME IN GAS-HEATING EQUIPMENT.**

★ ★ ★

Our production is limited in accordance with current restrictions, but we are doing everything in our power to ship Reznor Unit Heaters "when promised."

REZNOR

REZNOR MANUFACTURING CO.
105 JAMES ST. • MERCER, PA.

"GAS HEATERS EXCLUSIVELY SINCE 1888"

PILE HAMMERS
and
EXTRACTORS
HOISTS—DERRICKS
WHIRLERS

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POSTWAR PROJECTS (Cont'd.)

N. Y., Woodbourne—Dpt. P. Wks,
Office Bldg., Albany, Zone 1, plans comp
by C. J. White, com. Div. Archite
State Office Bldg., Albany, Zone 1, dry
cold storage bldg. at Institute for Def
Delinquents, COR-49, Dpt. Corre
State Office Bldg., Albany, Zone 1,
Financing not provided. CD 3/3/44—
3/23/44.

N. C., Siler City—Chatham Co. Hos
F. J. Boling, pres. Bd. Trustees, plan
E. G. Flannagan, Henderson, hos
$175,000.

O., Norwood—Bd. Educ., Williams
preliminary plans by F. Cellarious
E. 4 St., Cincinnati, 2 story, bsmnt.,
addns. **$200,000.**

★**O., Toledo**—University of Toledo, P.
pres., Bancroft St., plans 5% comp
by Bellman, Gillett & Richards, 518 J
son Ave., 3 story, stone women's acti
center and dormitory, **$225,000**; 3 story,
men's dormitory, **$149,000**; 2 story
industrial research bldg. **$150,000.**

Okla., Ada—East Central Teachers
lege, Ada, plans 5% completed, addnl.
mitory for women, **$175,000.** Financing
provided.

Okla., Tecumseh—State Bd. Affairs,
tol, Oklahoma City, plans 5% completed
bldg., at State Training School for
Legal obstacles to be overcome, finan
not provided.

★**Ore., Portland** — Multomonah Co.,
Court House, plans under way shop
warehouse, Rocky Butte, **$110,000**; hos
and nurses home addns., **$350,000**; remo
ing, painting court house, **$75,000**; co
farm bldgs., **$165,000.** Financing avail
G. W. Buck, co. engr. CD 12/21—ENR 1

Pa., Biglerville—Biglerville Boro, c/o
L. V. Stack, superv. construction, Biglerv
plans by J. B. Hamme, 31 West Market
school addns. **$220,000.** Financing not
vided.

★**Pa., Chambersburg**—Chambersburg
pital, R. C. Gordon, genl. supt., Ch
bersburg, preliminary sketches completed
The Ballinger Co., 105 S. 12 St., Ph
hospital, **$700,000.**

Tex., Austin—City, City Hall, plans
completed by Associated Architects of
tin, c/o L. Page, Nalle Bldg., 2 story, po
and courts bldg. **$200,000.** Financing
vided. CD 8/16—ENR 9/7.

Tex., Austin—State, C. Stevenson,
Austin, plans by State Archt. Dpt., Au
Water and Sanitation Research B
$250,000. Financing not provided.

★**Tex., Corpus Christi**—City, City H
auditorium, **$275,000**; city hall, **$175,**
police station, **$150,000**; armory and defe
center, for Texas State Guard use, **$200,**
Financing not provided. A. McCormick,
engr. C. S. Moore, City Hall, plan engr.
10/19—ENR 11/2.

Tex., Galveston—Galveston Co., T.
Robinson, judge, Court House, jail. **$150,**
Financing not provided. C. C. Washingt
Court house, co. engr.

Tex., Greenville—Greenville Independ
School Dist., H. H. Chambers, supt., Gre
ville, plans by P. M. Geren, 806½ Burnet
Fort Worth, high school. **$375,000.** Financ
available. CD 2/12—ENR 2/22.

★**Tex., Houston**—University of Houst
4901 St. Bernard St., plans 25% co
pleted by A. C. Finn, Bankers Mtg. Bld
administration and auditorium bldg.,
200,000; plans 10% completed No. 1 Qua
rangle, incl. arts and science bldg., 2 s
bldgs., 3 other bldgs., on north side
campus, **$600,000**; No. 2 Quadrangle, in
little theatre, library, museum, fine a
bldg., facing Calhoun St., **$400,000**; No.
Quadrangle, incl. 2 athletic fields, din
hall, gym., men's dormitory, women's dorm
tory, on St. Bernard St., **$1,000,000**; No.
Quadrangle, incl. 3 engineering bldg
$750,000. Financing not provided.
10/19—ENR 11/2.

★**Tex., Texas City**—Texas City Ind. Scho
Dist., Texas City, plans by Jones & Tab
Union National Bank Bldg., Houston, hi
school, **$300,000**; School 2, **$150,000**; School
$150,000; gymnasium and auditorium bld
$150,000. Financing not provided. CD 12
ENR 1/11.

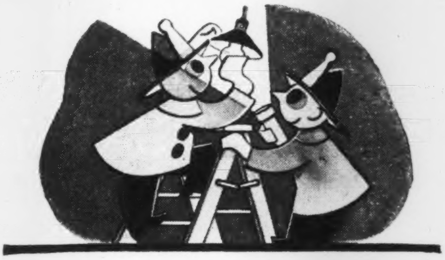
Va., Arlington — Arlington Co., Cou
House, 2 story, bsmnt., 60x160 ft., bric
rein.-con. court house addn. **$200,000.** Fi
nancing not provided. Upman & Adam
808 17 St. N. W., Wash., D. C., archts. C.
Kinnier, Court House, co. engr.

Va., Richmond—Henrico Co., Box 3-
plans 10% completed by State Bd. Educ
State Office Bldg., Richmond, 8 room schoo
$100,000; 12 room school, **$130,000.** Financ
ing provided.

★**Va., Roanoke**—Roanoke Bd. Educ., c/
chairman, plans by F. F. Stone &
Thompson, Roanoke, Junior High School
$3,000,000. Site purchased.

Wis., Baraboo—Sauk Co., Baraboo, plan
50% completed by J. J. Flad, 133 Langdo
St., Madison, county highway storage an
repair shop, **$200,000.** Mr. Amundson, Bara
boo, consult. engr. CD 8/30—ENR 9/21.

★**Wis., Kenosha**—Bd. Vocational & Adul
Educ., 1704 62 St., plans by McCaughe
Ridge, Ill., 2 story, concrete, steel, bric
& Peterson, Pickwick Theatre Bldg., Par
vocational school. **$500,000.** Financing available.



OUT LIKE A LIGHT!

A Mathews hydrant that needs fixing comes out of the ground like a light-bulb from its socket. Just give the hydrant a few turns. It unscrews and is ready for a trip to the shop. In its place goes a spare that screws into position just as easily. You never have to dig to fix a properly set Mathews hydrant, never have to make emergency, on-the-spot repairs. When work-crews have time on their hands, they can service the hydrant in the shop. The Mathews barrel contains all working-parts, including main and drain valve-seats. It unscrews from the elbow and lifts out through the loose protection-case. For vital fire protection, and important maintenance-economies, specify Mathews protection for your community!

MATHEWS HYDRANTS

Made by R. D. WOOD Company

400 CHESTNUT STREET, PHILADELPHIA 5, PA.

MANUFACTURERS OF SAND SPUN PIPE (CENTRIFUGALLY CAST IN SAND MOLDS) AND R. D. WOOD GATE VALVES

GENERAL ELECTRIC
WHITE
RIGID STEEL CONDUIT

G-E WHITE RIGID CONDUIT

ZINC COATED
HOT-DIPPED GALVANIZED

The best protective coating for steel is pure zinc and the best method of applying the zinc is by hot dipping

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G-E White Rigid Conduit gives permanent protection to wiring. G-E White is heavily coated inside and outside by immersion in molten zinc—the hot dipped galvanizing method. This method provides the most durable coating of pure zinc that can be applied by any process. In addition, G-E White has a coating of baked Glyptal inside and out.

G-E White Rigid Conduit is easy to install. It has accurate threads. Its smooth interior surface aids wire pulling. It can be used in the severest locations. It is resistant to heat, flame, cold, moisture, gas, alkalies and mechanical injury.

FOR FURTHER INFORMATION see the nearest G-E Merchandise Distributor or write to Section C451-113, Appliance and Merchandise Department, General Electric Co., Bridgeport, Connecticut.

BUY WAR BONDS AND HOLD THEM

GENERAL ELECTRIC

POSTWAR PROJE[faint] (Cont'd)

N. S., Halifax—Municipality
centre bldg., incl. library, college
art gallery and auditorium. **$350,000.**
Planning Comn., Halifax, archt.

Ont., Napanee—County Council of
and Addington, Napanee, plans by P
Development Comn., Napanee, count
$150,000.

Que., St. Joseph d'Alma—Province o
bec, c/o Ministry of Health, Quebe
hospital. **$150,000.** Dpt. P. Wks.,
City, engrs.

READY FOR BIDS

N. Y. Farmingdale—State Dpt. P.
State Office Bldg., Albany, Zone 1, plan
pleted heating work and service conne
at State Institute of Agriculture,
for Education Dpt., Education Bldg., A
$87,263. Div. Architecture, C. J. White,
State Office Bldg., Albany, engr. CD
ENR 1/27.

★**N. Y., New York**—New York City
ing Auth., 122 E. 42 St., Zone 17,
completed by E. M. Forbes and Sk
Owings & Merrill & Tandy, 5 E. 57 St.
22, Abraham Lincoln Houses, cont
1,829 apartments, on site bounded by
and E. 35 Sts., 5 and Park Aves., $8,8
CD 1/22—ENR 2/8.

★**N. Y., New York**—New York City
ing Auth., 122 E. 42 St., Zone 17,
completed by R. J. Riley, 62 W. 45 St.,
19, H. M. Prince, 101 Park Ave., Zo
and J. Whittlesey, 31 Union Square, Z
James Weldon Johnson Houses cont
ten 6 and 14 story apartment bldgs. a
modating 1,310 families, on site bound
3 and Park Aves., E. 112 and 115
$5,407,000. CD 1/22—ENR 2/8.

N. Y., Syracuse—Dpt. P. Wks., State
Bldg., Albany, Zone 1, plans completed
power house construction and equip
Syracuse State School, MH-73, for
Mental Hygiene, State Office Bldg., A
Zone 1, **$114,000.** Div. Architecture,
White, comr., State Office Bldg., A
engr.

N. Y., Utica—Dpt. P. Wks., State
Bldg., Albany, Zone 1, plans comp
main bldg. imprvs., MH-7, **$103,980;**
MH-76, **$7,480** both at Utica State H
for Dpt. Mental Hygiene Dpt., State
Bldg., Albany, Zone 1. Financing prov
Div. Architecture, C. J. White, comr.,
Office Bldg., Albany, Zone 1, engr.

ADVANCED TO ACTIVE STATUS

★**Mich., Detroit**—Bd. Educ., 1354 B
Ave., project cancelled, 4 story, bs
limestone, brick, glass, structural
concrete student bldg., for Wayne Unive
$1,000,000. Work now going ahead. S.
fian, 112 Madison Ave., archt. CD 3/5.

COMMERCIAL • BUILDINGS

PROPOSED WORK

Calif., Davis—R. F. Miller, B St., 62
dences, over **$150,000.**

★**Calif., Redwood City**—Land Developm
Inc., L. E. Werder, 1618 El Camino R
one thousand six hundred 1 and 3 s
residences, to cost from **$6,750** to $1
each, 2 shopping districts, incl. neces
roads, sewers, water lines, etc.

Calif., Watsonville—C. E. Morton,
Rogers Ave., 56 homes in Freedom Dist. O
$150,000.

Conn., Bridgeport—Congregation Rod
Sholom, M. Bufferd, pres., Maplewood
Iranistan Aves., brick, stone synago
Park and Capitol Aves. **$250,000.** Financ
not provided.

Conn., Norwich—J. Slosberg, 203 N. M
St., small homes on 30 acre field, East Gr
Plains, over **$150,000.** Financing not p
vided.

Conn., Wethersfield — Eastern Realty C
L. E. Segal, 11 Asylum St., Hartford, tw
story, 100x150 ft., business bldgs., divi
by parking space for stores, amusem
and sports, **$150,000.** Financing not provid

D. C., Wash.—New York Ave. Presbyteri
Church, 13 and New York Aves. N.W.,
story church addn., and enlarging chur
providing addnl. seating. **$350,000.**

La., Lafayette—Catholic Diocese, Rev.
B. Jeanmard, Bishop, Lafayette, semina
$300,000. Financing not provided.

Mass., Deerfield—Deerfield Academy,
Boyden, headmaster infirmary, dining ha
To exceed **$150,000.** Financing not provide

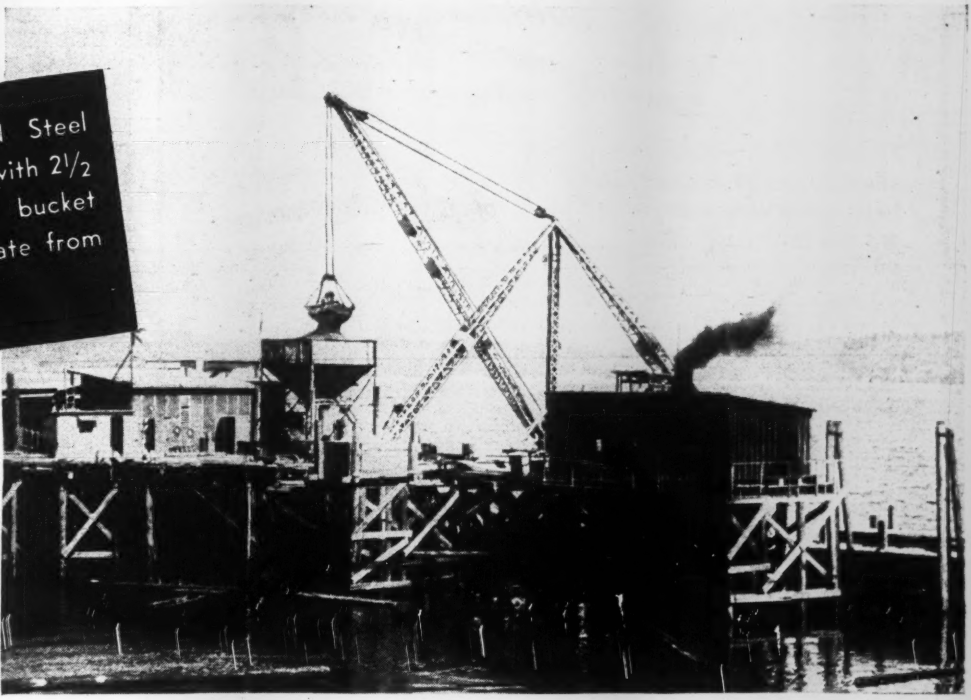
Mass., Worcester—W. T. Grant Co., 4
Main St., F. Sawyer, agt., 393 Main St., bric
steel department store. **$150,000.** Financ
not provided.

Mass., Worcester—S. S. Kresge Co., 5
Main St., brick, steel store, Main St. a
Barton Pl. **$150,000.** Financing not pr
vided.

★**Mo., St. Louis**—Charles A. Shaw, et a
c/o Shaw & Francis, Inc., 8011 Forsyth
Blvd., Clayton, St. Louis, Zone 5, multip
dwelling development on 42 acre tract
Delmar Blvd. west of Old Bonhomme R
Approx. **$500,000.** Site purchased.

American DERRICK ON CONSTRUCTION MATERIALS HANDLING

AMERICAN Steel Stiffleg Derrick with 2½ yard clamshell bucket unloads aggregate from a barge.



For materials handling with hook or bucket on construction projects, modern design AMERICAN Steel Derricks offer reach and lifting capacity at low initial investment. Their construction permits maximum load capacity with minimum weight, and simplifies erection, dismantling and transportation.

There are a lot of derrick jobs and there is an AMERICAN Steel Derrick for every one of them. In the Guy, Stiffleg, Steel Erectors and special types of AMERICAN designed and built derricks, AMERICAN has the derrick for your requirements.

Now is the time to look into your derrick requirements.

4516

Plan now . . . but wait for **AMERICAN!**

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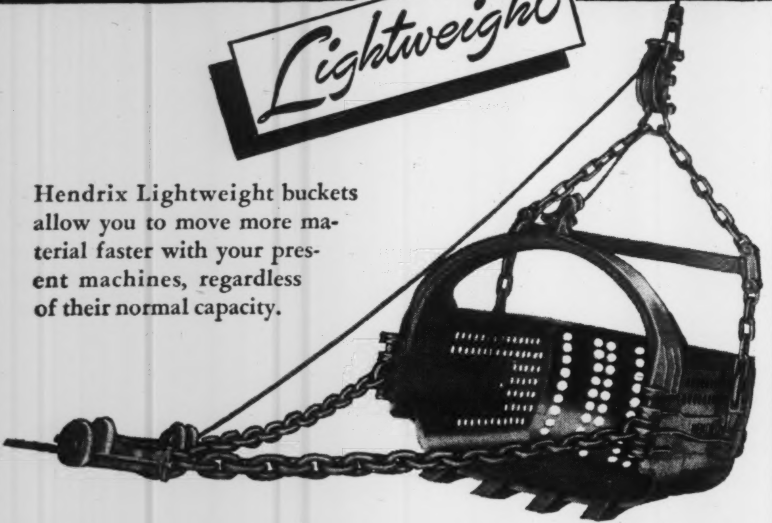
AMERICAN HOIST & DERRICK CO.
Saint Paul 1, Minnesota
CHICAGO SAN FRANCISCO NEW YORK

Wherever wire rope is fastened . . . use genuine
CROSBY CLIPS
with the Red-U-Bolt

DO A BETTER JOB FASTER



Hendrix Lightweight buckets allow you to move more material faster with your present machines, regardless of their normal capacity.

- ★ 20% TO 40% LIGHTER THAN OTHER BUCKETS, type for type.
- ★ ALL WELDED CONSTRUCTION for greater strength and durability.
- ★ MANGANESE STEEL chains, fittings, and reversible tooth points.
- ★ GETS FULL LOAD PAY MATERIAL EVERY TRIP—even in wet diggings.
- ★ PERFECTLY BALANCED—handles easier, fills faster, dumps quicker, cleaner.
- ★ LARGER BUCKET CAN BE USED ON SMALL MACHINE—or on a long boom.
- ★ 3 TYPES—light, medium and heavy duty, 3/8 to 30 cubic yard size.

HENDRIX Lightweight DRAGLINE BUCKETS

DESOTO FOUNDRY, INC. · MANSFIELD, LOUISIANA

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35 YEARS INSTALLING PILES
OF EVERY TYPE

CAST-IN-PLACE CONCRETE COMPOSITE
STEEL SECTIONAL PIPE TIMBER

SOIL AND ROCK EXPLORATION

MacARTHUR CONCRETE PILE CORPORATION
18 EAST 48th STREET, NEW YORK 17, N. Y.
BOSTON • CINCINNATI • NEW ORLEANS

POSTWAR PROJECTS (Cont'd.)

Pa., Phila.—Mt. Airy Lutheran Theolo cal Seminary, P. P. Hagan, chn. Un Appeal, 7301 Germantown Ave., Mt. Air Phila., new bldgs., and addns. to seminar **$150,000.** Financing provided.

R. I., Pawtucket—Ace Realty C H. E. Crowe, 255 Main St., fram homes development, Manton St. and Ne port Ave. **$150,000.** Financing not pro vided.

★**S. C., Rock Hill**—Winthrop College, Chn. State Bd. Educ., Columbia, dorm tories, class rooms, cafe, medical **$500,000.**

★**Tex., Dallas**—Southern Methodist Un versity, Dallas, chemistry bldg., $275,00 student union bldg., **$225,000**; library, $17 000. Financing provided. CD 4/21—EN 5/4.

★**Tex., Houston**—Episcopal Church, Rt. Rev. C. S. Quinn, Bishop of Episco pal Diocese, 1117 Texas St., hospita **$1,000,000.** Financing provided.

Tex., Pharr—Mrs. S. Jensen, et al, Phar hotel and stores bldg. **$250,000.** Financin provided.

★**Wash., Seattle**—Catholic Diocese of Se attle, 907 Terry Ave., Zone 4, hig school, in North End, **$500,000.** Financin not provided.

★**Wash., Seattle**—Catholic Diocese of Se attle, 907 Terry Ave., Zone 4, chape dormitory and classroom addns., at St. Ed ward Seminary, **$500,000.** Financing not provided.

Wash., Seattle—J. C. Penney Co., 330 W 34 St., New York, N. Y., expan. retail store 2nd Ave. and Pike St. **$200,000.** Financin provided.

Wis., De Pere—St. Norbert College, De Pere, science hall, **$200,000.** Financing no provided.

PLANS UNDER WAY

Calif., Oakland—Golden State Theater Circuit, Inc., 1842 Park Blvd., plans by O Deichmann, 1026 Market St., San Francisco theatre, seating 2,000 persons. **$200,000.**

Calif., San Jose—San Jose Amusemen Co., c/o Golden State Theater Circuit, Inc. 1842 Park Blvd., Oakland, plans by O. Deichmann, 1026 Market St., San Francisco, Victory Theatre, seating 1,600 persons, **$200,000**; Garden Theatre, seating 1,200 person **$150,000.**

★**Fla., Jacksonville**—St. Luke's Hospital Assn., Springfield Blvd., plans under way 2 wings and operating facilities, and reconstruct, remodel all other wings; coffee shop for visitors, approx. **$500,000.** Financing not provided.

Ind., Elkhart—Mennonite Bd. of Missions & Charities, Elkhart, plans by Vonnegut & Wright, 1126 Hume-Mansur Bldg., Indianapolis, 3 story, bsmnt., brick hospital and nurses' home. **$400,000.** CD 12/28—ENR 1/11.

★**Ind., Fort Wayne**—C. D. Light, 335 Lincoln Bank Tower, preliminary plans by Associated Engineers, Inc., engr.-archt., 230 E. Berry St., 16 story, bsmnt., 120x150 ft., brick, stone, structural steel, rein.-con. apartment hotel, containing bsmnt. garage, shops, offices, Ewing and Wayne Sts. **$750,000.**

Md., Baltimore—Park Central Apartment Co., c/o Hal A. Miller & Associates, archts., 1102 North Charles St., plans 95% completed 6 story, bsmnt., concrete, brick, apartment, containing 72 suites. Site not selected. Financing available.

Mass., Lawrence—Bon Secours Hospital, c/o Curtin & Riley, archts., 45 Newbury St., Boston, hospital. **$150,000.** Financing not provided.

Mass., Worcester—Beth Israel Synagogue, c/o J. Bilzerian, archt., 9 Walnut St., brick, concrete, stone synagogue, Pleasant St. To exceed **$150,000.**

Minn., New Ulm—Dr. Martin Luther College, New Ulm, plans by Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, girls' dormitory, **$200,000.**

Mo., Kansas City—St. Elizabeth Church, P. R. Kennedy, pastor, plans by J. B. Shaughnessy, Reliance Bldg., memorial hall, **$150,000.**

Neb., Omaha — German-American Club, 4026 S. 13 St., plans by C. Stangel, 2923 N. 48 St., old people's home, **$150,000.** Financing not provided.

N. Y., New York—New York Archdiocese, Most Rev. F. S. Spellman, pres., 477 Madison Ave., Zone 22, plans under way by Voorhees, Walker, Foley & Smith, 101 Park Ave., Zone 17, church and parochial school of St. Mary Magdalen, Ave. D. between 12 and 13 Sts. **$450,000.** Financing provided.

★**N. Y., New York**—Roosevelt Hospital, 9 Ave. and 59 St., Zone 22, plans by York & Sawyer, 101 Park Ave., Zone 17, 5 story service pavilion, 9 Ave. between 58 and 59 Sts. **$750,000.** Financing not provided.

O., Toledo—Superior-Jefferson Hotel Corp., Superior and Jefferson Sts., plans by Bellman Gillett & Richards, 518 Jefferson St., modernizing Secor Hotel, **$150,000.**

★**Pa., Bryn Mawr**—M. M. Jack, 717 Sansom St., Phila., preliminary sketches under way housing development, Waverly Estates, Rock Creek Rd. **$600,000.** Financing provided.

Getting results...in a BIG way!...

In 1939, when Hitler struck at Poland, trucks took only a few hundred thousands tons of ore from America's iron mines. *In 1944, trucks hauled out* OVER 50 MILLION TONS!

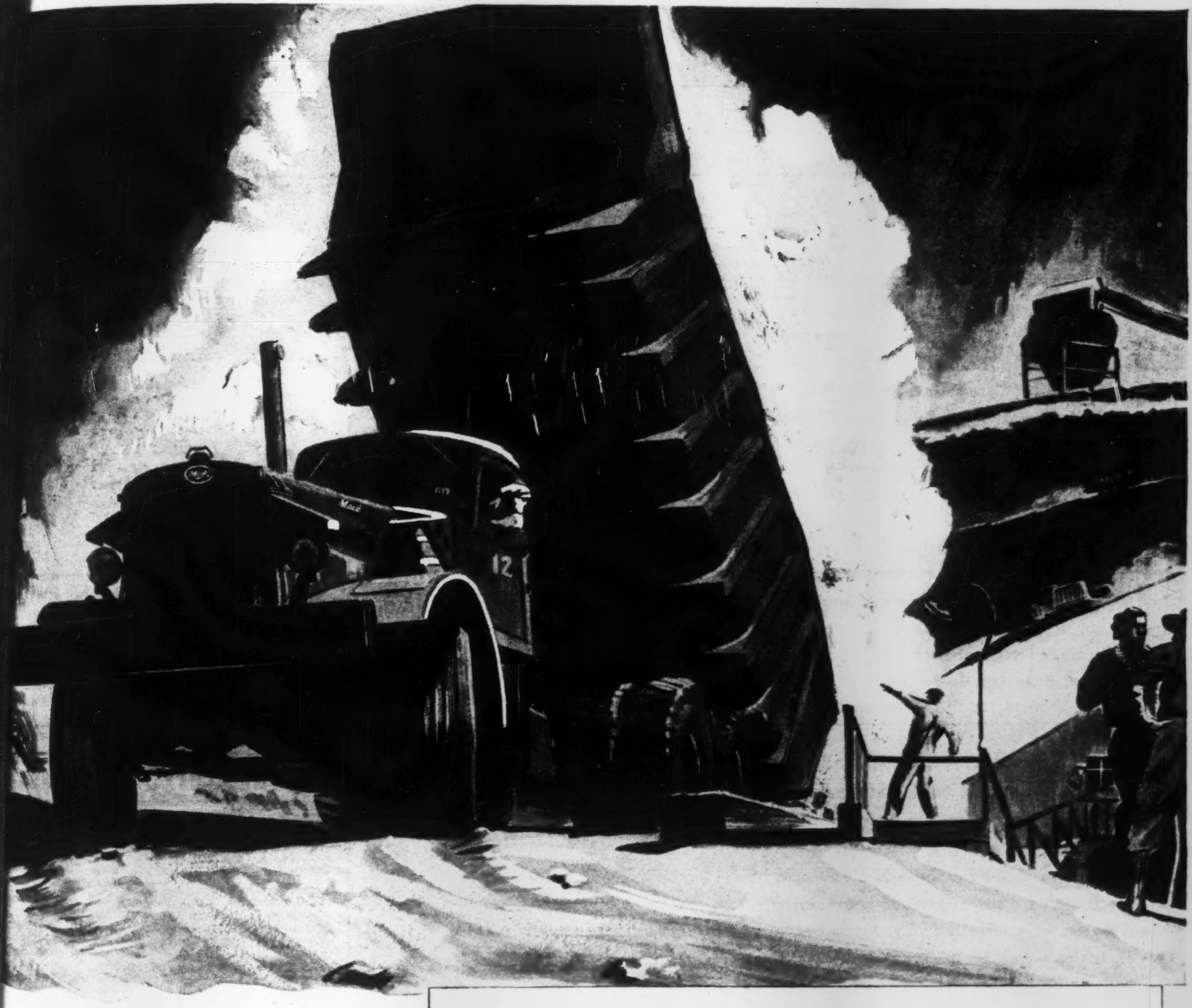
This ore plus scrap metal makes over 35 million tons of steel . . . more than all the steel in all passenger cars now on the road. It is steel enough for almost a million medium tanks . . . or over 110 million 50-cal. machine guns . . . or 15 million big 16-inch Navy shells . . . or more than 800 mighty battleships.

Huge 6-wheel, 30-ton capacity Macks like the one shown below, as sketched by Peter Helck, are doing a lion's share of this big ore-hauling job.

The biggest trucks in standard production today . . . these Macks have *lowered* open pit mining costs, while time and again setting new production records on the job.

Their work is typical of the many, many ways in which Macks, both big and small, are serving the people of America . . . and helping their owners cut costs.

Their stamina is a good example of why Macks for 44 years have been America's No. 1 line of trucks for tough hauling jobs.



★ BUY THAT EXTRA WAR BOND TODAY ★

Mack Trucks, Inc., Empire State Building, New York 1, N.Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N.Y. Factory branches and dealers in all principal cities for service and parts.

Mack
TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

Performance Counts!

HOW TO MAKE YOUR "B" MACHINE LAST LONGER

"I've been around quite a bit. There ain't nothing like a MUELLER "B" Machine for tapping and drilling holes in mains or inserting and taking out corporation stops under pressure. They are so danged popular, I guess at least 95% of the water works must use 'em. They can take a lot of punishment and year round use, but when they are thrown around or handled careless like by green hands they wear out just like any other tool. New ones ain't so easy to get right now so I figure it's smart to take care of our machines. Here are the rules we use. . . Oil thoroughly all parts before using. Put plenty of MUELLER Cutting Grease on drills and fill flutes of taps before using. Don't feed drill too fast. Don't let machine lay around for hours to rust. Right after using, clean out all chips and grease. If you let 'em cake up only the body cleaning chisel will get 'em out. Wipe boring bar clean its entire length and oil thoroughly. Oil feed collar. Keep by-pass open. After machine is clean and washed, wipe all surfaces, especially steel parts, with an oiled rag. Keep every piece in its place in the box—well oiled, and keep box away from moisture."

"B" DRILLING AND TAPPING MACHINE

"BUY BONDS"

MUELLER CO. FOUNDED 1857
DECATUR 70, ILL. LOS ANGELES 23, CALIF.

POSTWAR PROJECTS (Cont'd.)

Pa., Swarthmore — Trinity Church Swarthmore, 300 N. Chester Rd., Rev Christion Anderson, rector, 510 N. Ch Ave., preliminary sketches by Karche Smith, 1520 Locust St., Phila., church a **$150,000.** Financing provided.

R. I., Providence—Rhode Island Histo Society, 52 Power St., sketches by P Greer, 31 Benevolent St. and J. Hutc Cady, 536 Hospital Trust Bldg., brick, auditorium and art gallery addn. $20 Financing not provided. CD 3/2—ENR

S. D., Sioux Falls—Augustana Co Sioux Falls, preliminary plans by H. S nagel, National Bank of S. D. Bldg., lib remodeling old main bldg., administra and girls dormitory addns. $350,000. Fin ing available. CD 12/1/43—ENR 12/16/

Tex., Dallas—St. Paul Hospital, Bryan St.; plans by B. W. Lanum, and Kleuser, maternity hospital unit $350,000. nancing not provided. CD 2/21—ENR

Tex., San Angelo—First Methodist Ch San Angelo, plans 10% completed by Lemmon, Tower Petroleum Bldg., Da church. **$150,000.** Financing not provi

Tex., Waco—Baylor University, P. M. pres., Waco, preliminary plans by Wyat Hedrick Co., 1005 First National Bank B Fort Worth, masonry Browning Libr **$250,000.** CD 4/10/44—ENR 4/20/44.

Utah, Salt Lake City—Sears Roebuck Co., 304 S. Main St., plans by Ashton Evans, Beneficial Life Bldg., retail s **$250,000.** CD 3/27—ENR 4/6.

Wis., Stoughton—First Lutheran Chu Stoughton, plans by H. C. Haeuser, 759 Milwaukee St., Milwaukee, Zone 2, chu **$150,000.** Financing not provided.

Alta., Edmonton—St. Joseph Hospital Edmonton, plans by G. H. McDonald, Jegler Bldg., hospital addn. About $175,

READY FOR BIDS

Md., Baltimore—Doctor's Hospital, N. Charles St., plans completed by F. S. Moehll & Assoc., 330 N. Charles St., ho tal bldg., alterations, addns. $150,000.

Mass., Haverhill—Owner, c/o M. E. W mer, archt., Hillside Dr., Portsmouth, N. plans completed 2 story, 145x175 ft., bri steel store bldg. **$150,000.**

★**Mich., Detroit**—Catholic Central H School, 60 Belmont Ave., plans comple by McGrath & Dohmen, 2631 Woodwa Ave., 2 story, brick, concrete, steel, st high school, garage and power hou **$1,000,000.** Financing provided.

★**N. Y., Rochester**—Rochester Telepho Co., 59 Stone St., plans completed story, steel, limestone office, Stone **$500,000.**

CONTRACTS AWARDED

★**California**—Henry Doelger Builder, In 320 Judah St., San Francisco, 2,400 ho subdivision, on 370 acre acquired site, nor end of San Mateo Co., between Junipe Serra and Skyline Blvd. Owner builds. Ow **$2,000,000.**

★**Colo., Longmont**—St. Colletta School, 3, Jefferson, Wis., main bldg., cottage chapel, to F. J. Kirchhof Constr. Co., 7 Lawrence St., Denver. Est. $1,000,000. C 9/7—ENR 9/21.

★**O., Cleveland**—Western Reserve Un versity, 10940 Euclid Ave., design an construction, Communications Institute Arts & Sciences, 3 story housing televisio studios, recording room, etc., on campu to Austin Co., 16112 Euclid Ave. Es **$5,000,000.**

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ill., Chicago—FACTORY—Doughnut Corp 445 N. Lake Shore Dr., 100 x 170 ft., brick concrete, steel factory. Site purchased.

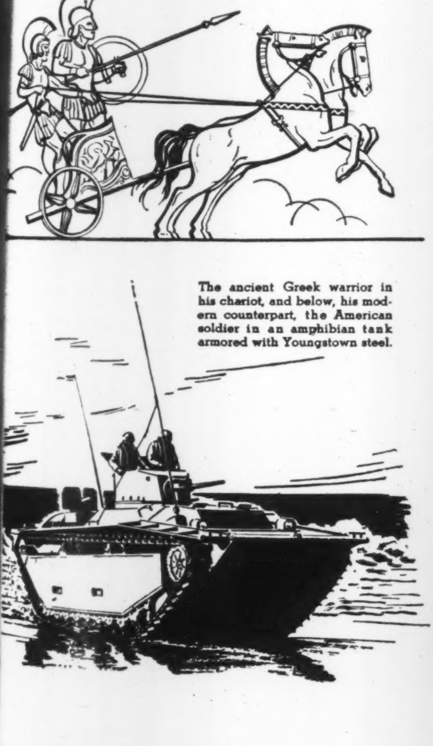
★**Ill., Pekin**—PLANT BLDGS., etc.—Corn Products Co., S. Second St., increase cerelose prodcction accommodations, $3,**000,000;** personnel office, assembly conference room, parking space, etc., **$350,000;** solvent oil extraction plant, **$350,000;** modernizing No. 1 Steep House, **$350,000;** imprv. milling wet starch, and feed departments, $127,500; C.S.U. loading station coverings, $20,000; permanent housing for mogul and amijel roll house, **$40,000;** 2 filters for washing starch **$70,000;** relocating dustless grit sys. **$80,000;** new mechanical stores warehouse **$70,000;** railroad track facilities imprvs. within plant, **$75,000.**

Ill., Pekin — BOILER HOUSE — Quaker Oats Co., S. Second St., boiler house. **$60,000.**

Mass., Marlboro—BUS TERMINAL—Boston, Worcester Lines, Worcester Rd., Framingham, brick, steel, concrete bus terminal storage and maintenance facilities, $50,000.

Mass., Watertown — PLANT — Kimball Lumber Co., 148 Waltham St., rebuilding plant, destroyed by fire. To exceed $40,000.

The Greeks had a word for it!



The ancient Greek warrior in his chariot, and below, his modern counterpart, the American soldier in an amphibian tank armored with Youngstown steel.

"SIDEROS"--meaning literally "metal from heaven"--was the ancient Greek word for Steel. It had its origin in meteoric iron. It was a precious metal, rarer than silver or gold. Iron, hardened into steel at crude forges, was shaped into spearheads and swords.

Superiority in the use of steel enabled the little armies of the Greek city states to throw back across the Bosphorus and eventually destroy the barbarian hordes of Persia, bent on conquest of the ancient world.

Today, an ever increasing superiority in the use of steel is enabling America and her allies to destroy the twentieth century barbarian enemies of modern civilization.

Tomorrow, with an overwhelming superiority in the use of steel, America must insist on remaining strong and free--to use its steel to preserve a lasting peace and to build a civilization better than any the world has ever seen.

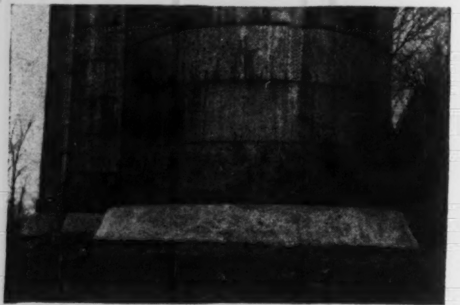
QUALITY
YOUNGSTOWN
SERVICE

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN, OHIO
Manufacturers of
CARBON · ALLOY AND YOLOY STEELS
Pipe and Tubular Products - Sheets - Plates - Conduit -
Bars - Electrolytic Tin Plate - Coke Tin Plate - Rods - Wire -
Nails - Tie Plates and Spikes - Alloy and Yoloy Steels.

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



"GUNITE" SAVES FOUNDATIONS

The "before" and "after" photos show two of three water standpipe foundations which we restored last year for the Village of Carthage, N. Y.

These foundations were very seriously disintegrated and in dangerous condition. All loose and deteriorated concrete was chipped away and mesh reinforced "GUNITE" placed 3" to 12" thick to restore the foundations to original dimensions. Extreme care was taken to place "GUNITE" well under the bearing edge of the standpipe.

This work was done under the supervision of Mr. J. Lamprecht, Consulting Engineer, Fayetteville, N. Y.

Our 74-page bulletin 2200 describes scores of uses of "GUNITE". Write for your copy.

MANUFACTURERS OF THE "CEMENT GUN"

Clipper
MASONRY SAWS

A special shape or shorter length need only be as far away as your Clipper Masonry Saw. The basic feature of Clipper is the new multiple cutting principle . . . . a method developed especially for Masonry Materials. You can be sure to cut with the fastest cutting speed and to obtain the longest blade life. Write for Catalog.

CLIPPER
MANUFACTURING CO.
4037 Manchester St. ST. LOUIS, MO

POSTWAR PROJECTS (Cont'd.)

Mo., Clayton (St. Louis, Zone 5, P. O.)—SALES and SERVICE, etc.—Arthur R. Lind burg, Inc., Grand and Lindell Blvds., S Louis, Zone 3, automobile sales and servic bldgs., at 7729-33 Forsythe Blvd. **$75,000.**

Mo., St. Louis—FACTORY—Spradling Inc., 1112-26 S. Grand Blvd., factory add **$200,000.**

★**O., Lima**—MILL—Feed Mills Div. General Mills, Inc., Clinton, Ia., feed mixin mill, **$500,000.**

★**Pa., Erie**—FACTORY—Erie Resistor Mfg Co., 644 W. 12 St., brick steel concret factory. **$500,000.** Financing provided.

Pa., Phila. — FACTORY — Bowman Gum Inc., 4865 Stenton Ave., factory on 22 ac site, bounded by Rising Sun and Adam Ave., Reading R.R. and Tacony Creek. Sit purchased.

R. I., Providence—SERVICE, etc.—Hay Realty Corp., 505 Central Ave., Pawtucket automobile service and showroom bldg. N Main St. **$50,000.** Financing not provided.

Tex., Dallas—Austin Bridge Co., 1813 Clarence St., industrial bldg., on 85 acre site purchased on Eagle Ford Rd. Over **$150,000.** Financing not provided.

Tex., Galveston — INDUSTRIAL — Burns Distributing Co., E. F. Burns, 3320 Market St., industrial bldg. Over **$40,000.** Site purchased. Financing available.

★**Tex., Garland**—PLANT—Luscombe Aircraft Co., Bear Tavern Rd., Trenton, N. J., plant. Over **$500,000.**

Tex., San Antonio—STORAGE—Alamo Plumbing Supply Co., Inc., 611 N. Main St., supply storage bldg. and shop. Over **$40,000.** Site purchased. Financing available.

★**Va., Radford**—PLANT—American Viscose Corp., 350 Fifth Ave., New York, N. Y., plant on 741 acre site on New River, near here. **$10,000,000.** Legal obstacles to be overcome.

Ont., Beamsville—FACTORY—N. M. Bartlet Spray Works, Beamsville, factory addn. About **$75,000.**

Ont., Peterboro—PLANT—Canada Bread Co., Ltd., 421 Chambers St., bakery plant. About **$45,000.**

Ont., Toronto—PLANT—Globe & Mail Publishing Co., Ltd. 140 King St. W., printing and publishing plant addn. **$150,000-$200,000.**

Ont., Toronto—PLANT—Ideal Bread Co., Ltd., 183 Dovercourt Rd., bakery plant. About $75,000.

Ont., Toronto—PLANT—Taylor Instrument Companies of Canada, Ltd., 110 Church St., plant addn. About **$75,000.**

Que., Berthierville — PLANT — Melchers Distilleries, Ltd., Berthierville, plant. Over **$300,000.**

Que., Montreal—PLANT—Canada Cycle and Motor Co., Ltd., Murray St., plant exten. **$50,000.** Site purchased.

Que., Montreal—PLANT—Miles Aircraft Co., Ltd., Reading, England, plant mfg. commercial air transport planes, **$150,000.**

PLANS UNDER WAY

★**Calif., East Los Angeles (br. Los Angeles)**—MILL—Globe Mills, 907 E. 3 St., Los Angeles, mill and grain elevator, on 12 acre site, Goodrich Blvd., and Ferguson Dr. **$2,000,000.** Pillsbury Mills, Inc., M. A. Lehman, vice pres., Minneapolis, Minn., engrs.

Calif., Van Nuys—WAREHOUSE—Bekins Van & Storage Co., 1335 S. Figueroa St., Los Angeles, 5 story, 70x90 ft., rein.-con. warehouse, 15,000 Ventura Blvd. **$100,000.** C. Deuel, 257 S. Spring St., Los Angeles, consult. engr.

Colo., Denver—PLANT—Canada Dry Ginger Ale, Inc., 100 E. 42 St., New York 17, N. Y., plans by W. Cory, 1775 Bway., New York, N. Y. ,bottling plant, **$250,000.** CD 1/17/44—ENR 1/27/44.

Mass., Newton — FILLING STATION — Socony Vacuum Oil Co., Inc., 205 Sixth St., Cambridge, plans nearing completion gasoline filling station with underground tanks, at 221 Washington St. To exceed **$40,000.**

Mass., Roxbury—SERVICE BLDG., etc.—Westminster Motors, Inc., c/o A. Winebaum, 68 Devonshire St., Boston, plans 50% completed service and sales bldg. addn., alterations, Warren St. **$45,000.**

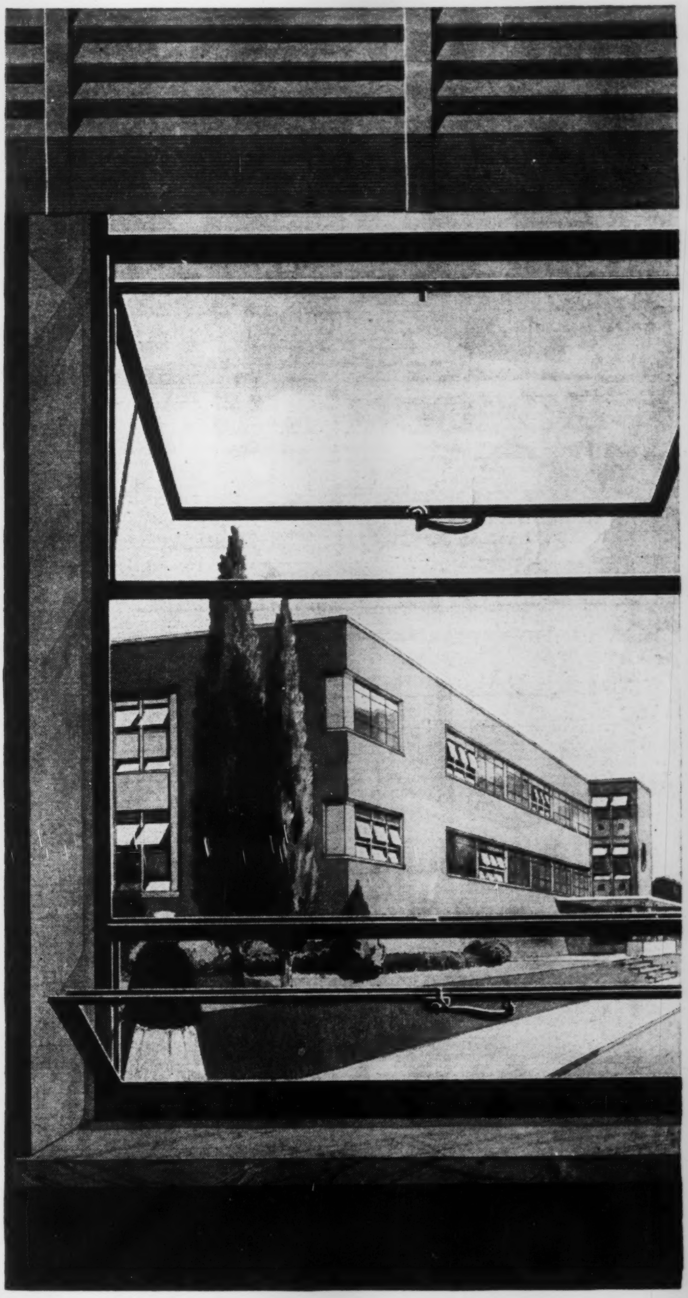
★**Minn., St. Paul**—FACTORY—Minnesota Mining & Mfg. Co., W. L. McKnight, pres., 900 Fauquier St., 4 story, 200x580 ft. factory, Fauquier and Mendota Sts., adjoining existing plant, for scotch tape production, and 1 story, 50x75 ft. bldg. **$2,500,000.** C. P. Pesek & W. A. Thomas, c/o owners, engrs.

★**N. J., Hillside**—FACTORY—M & M Ltd., 471 Clinton Ave., Newark, plans by Francisco & Jacobus, 511 5 Ave., New York, N. Y., 1 story candy factory, **$1,000,000.**

★**N. Y., Yonkers**—LABORATORY—Burroughs Wellcome & Co., 9 E. 41 St., New York, Zone 17, plans by Delano & Aldrich, 126 E. 38 St., New York, Zone 16, research laboratory, Scarsdale Rd. **$1,500,000.**

★**R. I., Providence**—POWER GENERATING STATION—Narragansett Electric Co., 49 Westminster St., plans by P. D. Creer, 31 Benevolent St., brick, steel, concrete steam plant, power generating station, **$2,000,000.** Financing not provided.

Nurses Home, Mercy Hospital, Cedar Rapids, Iowa. Dane D. Morgan, Architect-Engineer. The Stark Building Company, Builders



Hospital Buildings equipped with Lupton Metal Windows have abundantly daylighted ooms with controlled, natural ventilation free om drafts. Lupton Windows are weather-ight and easily operated. Forty years' experi-nce has gone into their modern design and onstruction. For complete dependability, pecify Lupton Metal Windows.

See our Catalog of Post War Types and Sizes in Sweet's for 1945, or write today for reprint.

MICHAEL FLYNN MANUFACTURING CO.
E. Allegheny Ave. at Tulip St., Philadelphia 34, Pa.
Member of the Metal Window Institute

LUPTON
METAL WINDOWS

LIDGERWOOD
HOISTS
FOR CONTRACTORS
FOR BLAST FURNACES
FOR HANDLING CORE DRILLS
FOR CAR HAULING
FOR MINE SHAFTS
FOR STEEL ERECTING
ARMY E NAVY
M

Wherever the situation calls for hoisting or handling materials, there is a LIDGERWOOD electric, steam, gasoline, diesel or belt hoist designed to do the job right.

LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
MAIN OFFICE AND WORKS • ELIZABETH B, NEW JERSEY

BAILEY METERS AND CONTROLLERS

FOR SEWAGE TREATMENT AND WATER SUPPLY . . .

● Venturi Tubes, Weirs, Flumes, Nozzles and other primary elements. Mechanically and Electrically operated Registers and Complete Automatic Control Systems.

BAILEY METER COMPANY
1029 IVANHOE ROAD ● CLEVELAND, O.
Bailey Meter Co., Ltd., Montreal, Canada

Diamond Core Drilling Contractors

FOUNDATION TESTING
Dams, Heavy Structures, etc.
STAGE SECTIONAL PRESSURE GROUTING
Contract or Rental

MFR'S DIAMOND & SHOT CORE DRILLS GROUT MIXING MACHINES, PACKERS AND GROUT PUMPS.

MOTT CORE DRILLING CO.
HUNTINGTON, W. VA.

POSTWAR PROJECTS (Cont'd)

R. I., Providence—MANUFACTURIN
Owner, c/o O. DiSaia, archt., 703 Gard
Bldg., sketches, 2 story, bsmnt., concre
brick mfg. bldg., Bway., Atwells Ave, a
Bourne St. Over **$40,000.**

Tex., Goose Creek—SERVICE, etc.—R.
Hemphill, Goose Creek, plans under w
service and storage bldg. $60,000. Fina
ing provided.

Wis., Appleton—WAREHOUSE, etc. —
C. Shannon Co., 527 N. Morrison St., pla
by D. M. Schoepke, 1525 Elizabeth Av
Marinette, 1 story, 100x400 ft., warehou
and 2 story, bsmnt., 50x50 ft., brick, ste
office bldg. Financing provided.

Ont., Toronto — PLANT — Brigdens, Lt
160 Richmond St., plans by H. G. Holma
2135 Culp St., Niagara Falls, plant add
About **$50,000.**

Ont., Toronto—PLANT—Lever Bros., Lt
G. A. Nairne, pres., 229 Eastern Ave., pla
bldg. extens. About **$100,000.** W. M. Cutler,
Hampshire St., Boston, Mass. U. S. A., eng

Ont., Toronto—FACTORY—Radio Compo
ents, Ltd., 560 King St. W., plans by Ka
lan & Sprachman, 305 Dundas St. W., fa
tory addn. **$65,000.** CD 2/13—ENR 2/22.

READY FOR BIDS

Wis., Darlington—GARAGE—Ostby Bro
Argyle, plans completed by L. Siberz, 103 W
Miflin St., Madison, 1 story, part bsmn
90x130 ft., brick front, concrete block sid
and rear, steel trusses garages.

Wis., Kenosha—FACTORY—Nash-Kelvin
tor Corp., 5626 25th Ave., plans complete
by Giffels & Vallet, Inc., 1000 Marquet
Bldg., Detroit, Mich., 1 story, 200x250 ft
brick, steel, Factory Bldg. 39 addn., con
crete fdn. CD 3/9—ENR 3/15, under Indus
trial.

CONTRACTS AWARDED

Conn., Torrington—GARAGE AND STOR
AGE—City Oil & Coal Co., Inc., 100 Lincol
Ave., 1 story, brick, concrete garage an
storage, to Felix Buzzi & Son, 612 Sout
Main St. Est. **$45,000.**

ADVANCED TO ACTIVE STATUS

★**Calif., Tracy**—FACTORY—H. J. Hein
Co., 2900 San Pablo Ave., Berkeley
project cancelled 2 and 3 story, brick, con
crete, food processing factory. **$1,500,00**
Work now going ahead. CD 2/8—ENR 3/

UNCLASSIFIED

PROPOSED WORK

Calif., Exeter—SWIMMING POOL—Exete
Union High School Dist., Exeter, swimmin
pool, **$60,000.**

★**Calif., Oakland**—SWIMMING POOLS, etc
—City, City Hall, bond election May 8, 5
swimming pools, **$600,000**; other recreational
projects in East Oakland, **$423,000.** CD 3/5—
ENR 3/22.

Calif., Salinas—PLAYGROUND—City, City
Hall, playground, **$76,500**; commercial district off-street parking lots, **$80,000.**

Conn., Middletown—PARK DEVELOPMENT—State Park & Forest Comn., State
Office Bldg., Hartford, development 172
acres park and recreational facilities, Hanging Rock Rd. **$50,000.** Financing not provided.

Ill., Pekin—GOLF COURSE—Pekin Park
Dist., A. Keller, secy., Mineral Springs, Bath
House, Pekin, exten. golf course from 9
holes to 18. **$25,000.**

Ia., Hawarden — AIRPORT — City, L. R.
Ball, mayor, City Hall, approved **$25,00**
bond issue, airport enlargement.

Me., Lewiston — PLAYGROUND — City,
Prof. Myhrman, comr. Playgrounds, City
Hall, playground. **$125,000.** Financing not
provided.

N. Y., Brooklyn—PARK IMPROVEMENTS
—Dpt. Parks, Div. Museums & Institutions,
Arsenal Bldg., Central Park, 64 St. and 5
Ave., New York, general imprvs., at Botanical Garden, Brooklyn Institute of Arts &
Sciences, PV-236, **$143,890.**

N. Y., Corning—STADIUM, etc.—City,
City Hall, stadium and athletic field.
$65,000. State Aid Planning Funds allotted.

N. Y., Glen Cove—PARKING FIELDS—
City, City Hall, parking fields near Glen St.
and city hall, **$28,200.** State Aid Planning
Funds allotted.

Pa., Albion—AIRPORT—State Aeronautics
Comn., F. Chalfant, chn., Harrisburg, airport, **$30,000.**

Pa., Ashley — AIRPORT — State Aeronautics Comn., F. Chalfant, chn., Harrisburg, airport, 1,800-2,700 ft. runway.
$52,500.

Pa., Austin—AIRPORT—State Aeronautics
Com., F. Chalfant, chn., Harrisburg, airport,
1,800-2,700 ft. runway, **$36,000.**

★**Pa., Avoca**—AIRPORT—State Aeronautics Comn., F. Chalfant, chn., Harrisburg,
airport, 4,700-5,700 ft. runway, **$2,295,000.**

Pa., Bangor—AIRPORT—State Aeronautics
Comn., F. Chalfant, chn., Harrisburg, airport, 1,800-2,700 ft. runway. **$48,000.**

J-M CORRUGATED TRANSITE

Strikingly Effective in MODERN DESIGN

Designed by Albert Kahn Associated Architects & Engineers, Inc.

Note how successfully Johns-Manville Corru-ated Transite has been used to achieve the rchitectural simplicity of streamlined and trictly utilitarian construction.

THIS modern plant of American Steel Foundries, with its horizontal glass and spandrel construction, is an excellent example of functional design, using the tough asbestos Transite sheets on the exterior walls.

Whatever the type of building you have in mind . . . *any* type . . . you'll find J-M Transite universally adaptable. It may be used alone or in combination with other building materials.

Of course, one of the outstanding qualities of this product, which makes a strong appeal to building owners, is its amazing durability. Corrugated Transite lasts indefinitely . . . requires no painting . . . no preservative treatment . . . no upkeep whatever. It's absolutely unaffected by the weather.

Check this brief summary of the outstanding features of J-M Corrugated Transite:

1. ***It's durable,*** because it's made of asbestos and cement, two almost indestructible materials, compressed and corrugated under terrific pressure for extra strength.

2. ***It's practical,*** because it can't burn, can't rust, can't rot, and has high resistance to acids, to gaseous fumes, and to severe temperatures.

3. ***It's economical,*** because it requires no maintenance, is 100% salvageable, and may be quickly installed.

4. ***It's versatile,*** because its stone gray color and beautiful, symmetrical lines blend well with all modern architectural plans and designs.

For more specific and detailed information as to how *J-M Corrugated Transite* will solve your construction problems, send for our new illustrated brochure on this subject. Call or write Johns-Manville, 22 East 40th Street, New York 16, New York.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville *Asbestos* CORRUGATED TRANSITE

New Highway Program Calls for *Dippers That Can Take It . . . .*

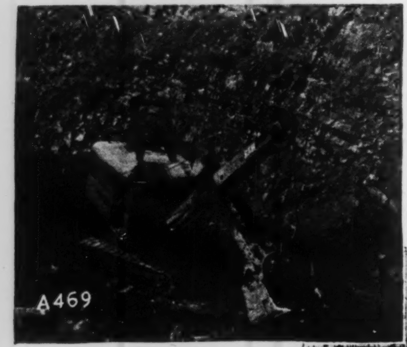
In the vast highway construction program which looms so prominently in postwar plans, the steady *dig, dig, dig* of the power shovel will spell the progress of the numerous jobs. Excessive time out will mean slowing up all down the line. As every road-building contractor knows, delays for repairs mount rapidly into lost dollars.

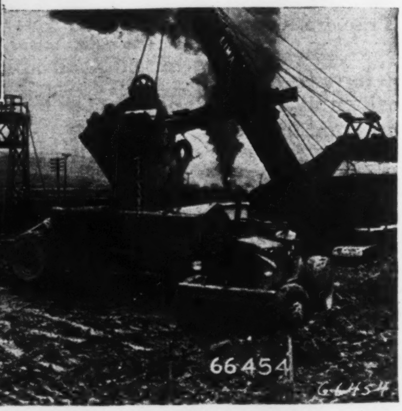
In power shovel operation, the dipper takes much of the punishment; being subjected to heavy shock loads as well as being in contact with materials which are in many cases severely abrasive.

In postwar highway construction, out time for dipper repairs will be considerably less than in the past because an ever-growing proportion of power shovels are equipped with Amsco manganese steel dippers. For over thirty years tough, work-hardening manganese steel has been demonstrating its superiority for withstanding the breakage stresses and grinding wear to which dippers are subjected.

Amsco renewable lip dippers are correctly designed for tomorrow's faster construction tempo—for faster digging and fuller loads. Shovel capacity has been increased by reducing dipper weight while maintaining size, and yet without sacrificing strength, rigidity or long life. The dipper is fast dumping because of a smooth interior, free of obstructions. "U" bolt and interlock fastening speeds up lip replacements. As the dipper is made of "the toughest steel known," the greatest possible wearing life and freedom from breakage are foregone conclusions.

Send for Amsco Dipper Bulletin 641-D.





A-469. Steady production on a Pennsylvania overpass project with a P & H Model 855 shovel equipped with an Amsco renewable lip dipper.

66454. Lima shovel equipped with an Amsco dipper at work on an Eastern highway project. Approximately 900,000 cubic yards of heavy clay and rock were moved in this narrow working area beside the N.Y.C. right-of-way.

Build-up and hard-surfacing welding of dipper lips and teeth is described in Bulletin 941-W.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN
Brake Shoe
COMPANY

POSTWAR PROJE (Cont'd)

Pa., Brockway—AIRPORT—State
nautics Comn., F. Chalfant, chn.,
burg, airport, 1,800-2,700 ft. runway.

Pa., Centerville—AIRPORT—State
nautics Comn., F. Chalfant, chn.,
burg, preliminary plans completed
airport. **$25,000.** Financing not pr

Pa., Conneaut Lake—AIRPORT
Aeronautics Comn., F. Chalfant, chn
risburg, preliminary plans completed
1 airport. **$30,000.** Financing not pr

Pa., Courtdale (br. **Wilkes-Barre**)
PORT—State Aeronautics Comn., F
fant, chn., Harrisburg, airport, 1,800-2
runway. **$52,500.**

Pa., Dunmore — AIRPORT — State
nautics Comn., F. Chalfant, chn., Harr
airport, 1,800-2,700 ft. runway. **$49,**

Pa., Eldred—AIRPORT—State Ae
tics Comn., F. Chalfant, chn., Harr
airport, 1,800-2,700 ft. runway. **$36,0**

Pa., Elizabethtown — AIRPORT
Aeronautics Comn., F. Chalfant, chn
risburg, airport, 1,800-2,700 ft. r
$45,000.

Pa., Elizabethville — AIRPORT
Aeronautics Comn., F. Chalfant, chn
risburg, preliminary plans completed
1 airport. **$36,000.** Financing not pr

Pa., Fairview—AIRPORT—State Ae
tics Comn., F. Chalfant, chn., Harr
airport, 1,800-2,700 ft. runway. **$27,**

Pa., Greencastle—AIRPORT—State
nautics Comn., F. Chalfant, chn., H
burg, airport, 1,800-2,700 ft. runway.

Pa., Huntingdon—AIRPORT—State
nautics Comn., F. Chalfant; chn., H
burg, airport, 2,700-3,700 ft. r
$383,500.

Pa., Martin's Creek—AIRPORT
Aeronautics Comn., F. Chalfant, chn., H
burg, airport, 1,800-2,700 ft. runway.
500.

Pa., Milford—AIRPORT—State Aero
Comn., F. Chalfant, chn., Harrisburg
port, 1,800-2,700 ft. runway, **$30,000.**

Pa., Myersdale—AIRPORT—State
nautics Comn., F. Chalfant, chn., Harr
airport, 1,800-2,700 ft. runway, **$52,500.**

Pa., Nanticoke—AIRPORT—State
nautics Comn., F. Chalfant, chn., Harr
airport, 2,700-3.700 ft. runway. **$383,5**

Pa., New Holland — AIRPORT —
Aeronautics Comn., F. Chalfant, chn.,
risburg, airport, 1,800-2,700 ft. ru
$45,000.

Pa., Olyphant — AIRPORT — State
nautics Comn., F. Chalfant, chn., H
burg, airport, 1,800-2,700 ft. ru
$45,000.

Pa., Reynoldsville—AIRPORT—State
nautics Comn., F. Chalfant, chn., H
burg, airport, 1,800-2,700 ft. ru
$45,000.

Pa., Titusville — AIRPORT — State
nautics Comn., F. Chalfant, chn., H
burg, preliminary plans completed C
airport. **$25,000.** Financing not pro

Pa., Watsontown—AIRPORT—State
nautics Comn., F. Chalfant, chn., Harri
airport, 1,800-2,700 ft. runway, **$30,000.**

Pa., White Haven — AIRPORT —
Aeronautics Comn., F. Chalfant, chn.,
risburg, airport, 1,800-2,700 ft. ru
$52,500.

R. I., Jamestown—BATHHOUSE
Town, F. Caswell, pres., Town Council
house, pavilion, Mackerel Cove Beach,
000. Financing not provided.

R. I., North Kingston—BEACH—Tow
D. MacLeod, chn., Comn., c/o Baker Coa
North Kingston, preliminary plans
way town beach and recreational area
exceed **$25,000.**

R. I., Providence—BLEACHERS—
Supt. Roger Williams Park, Elmwood
preliminary plans under way, bleache
various parks. To exceed **$25,000.**

R. I., Providence—PARK IMPR
MENTS—City, Supt. Roger Williams P
Elmwood Ave., preliminary plans under
Roger Williams Park, addns., imprvs.,
museum addn., comfort stations, miscell
ous imprvs., enlarging speedway, etc
exceed **$100,000.**

R. I., Westerly—ATHLETIC FIEL
Town, A. M. Cottrell, pres., Town Hall
school athletic field. To exceed **$25,000.**

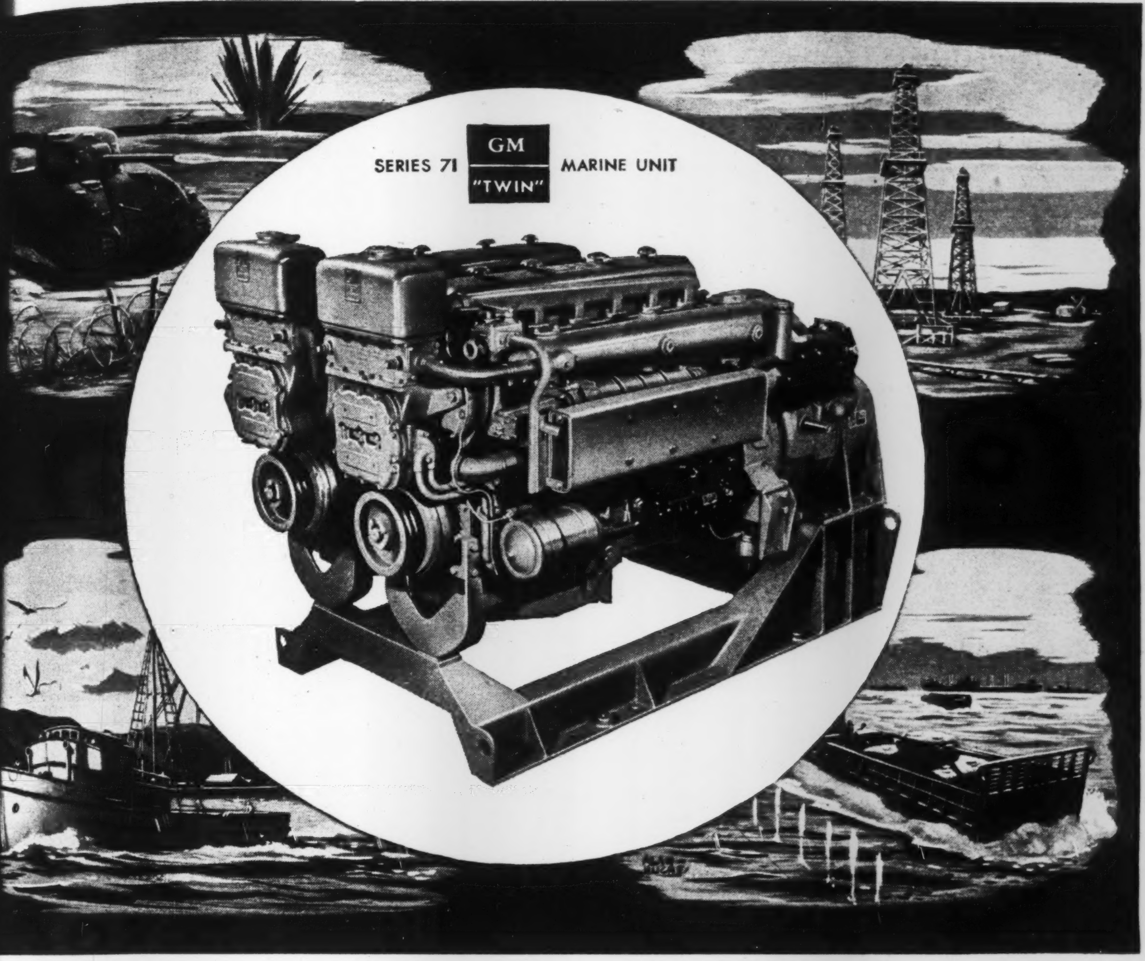
★ **S. C., Charleston**—PARKING AREA
City, City Hall, parking areas in m
of blocks in congested downtown bus
section. **$1,500,000.**

Tenn., Rockwood—STADIUM—City
Mayor, City Hall, stadium, **$35,000.**

Tex., Austin—BROADCASTING STAT
—Frontier Broadcasting Co., Little
Bldg., frequency modulation radio bro
casting station. **$40,000.** Financing
vided.

Tex., Nacogdoches—SWIMMING PO
etc.—City, City Hall, outdoor rein-
swimming pool, recreational park. Fin
ing not provided.

Tex., Wichita Falls — AIRPORT—
grading, paving, lighting airport. **$5**
CAA will help finance.



SAVING BOTH SPACE AND WEIGHT

This is a pair of General Motors series 71 Diesel engines built side by side, delivering their power through a single shaft. It is Detroit Diesel engineers' answer to an urgent call for a lot of dependable Diesel power in a small space.

Some of the jobs assigned the basic series 71 power units in "Singles," "Twins," and "Quads" are among the toughest on the books today—powering landing craft and driving Army M-3, M-4 tanks and M-10 tank destroyers.

It takes "oomph"—plenty of it—to plow a tank through hip-deep mud, to lift it out of shell craters, to keep it hot after the enemy—to beach and extricate a landing craft when the breakers are running high.

So it is easy to look ahead and see how these "multiple" Diesels will take hold of the countless jobs of industry and perform them equally well—particularly where the ratio of power to weight or space is of prime importance.

And remember, these "Twins" and "Quads," like the single sixes, share all the important developments which General Motors has contributed to Diesel science.

EEP AMERICA STRONG
BUY MORE WAR BONDS

GM
GENERAL MOTORS
DIESEL
POWER

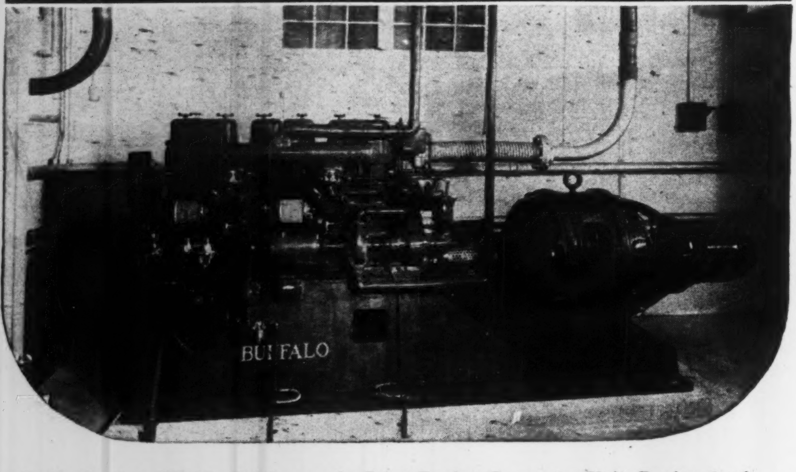
ENGINES . . 15 to 250 H. P. . . **DETROIT DIESEL ENGINE DIVISION,** Detroit 23, Mich.

ENGINES . . 150 to 2000 H. P. . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES . . . . ELECTRO-MOTIVE DIVISION, La Grange, Ill.

Quick Starting
EVERY TIME

BUFFALO ENGINES
ASSURANCE of PROTECTION



Radio Station WBAL, Baltimore. An RA-6 Engine Generator Unit. Engine 6 cyls., 5⅞" bore, 7" stroke, direct connected to 100 K.W., 1200 RPM Westinghouse generator. Fully automatic stop-start on failure of main source of current.

RADIO stations and fire protection systems both install emergency power equipment, but while, with good fortune, a fire system may never need stand-by power, the nature of radio means that its engines are cut in with some frequency.

It's a pleasure to hear, as we do, from radio station managers that their BUFFALO ENGINES never fail to give them power with the split-second response needed to maintain the stop-watch continuity of radio programming.

Fire, flood control, sewage works and water works have the same assurance of protection when BUFFALO ENGINES are installed. Engineers and others interested are invited to write for BUFFALO ENGINE specifications and data on the design and installation of stand-by equipment.

BUFFALO GASOLENE MOTOR COMPANY
DEPT. NR-45
BUFFALO 13, N. Y., U. S. A.

BUFFALO ENGINES
ASSURANCE of PROTECTION

BUFFALO ENGINES — 100 H. P. THROUGH 750 H. P.— IN GENERATOR AND PUMPING SETS FOR WATER WORKS — AIRPORTS — COMMUNICATIONS — FLOOD CONTROL — HOSPITALS — INSTITUTIONS — MINES — MOVABLE BRIDGES — THEATRES — SEWAGE PLANTS.

POSTWAR PROJE S (Cont'd.)

Tex., Wills Point—AIRPORT—C
ing, paving, lighting airport. $68,0
will help finance.

Tex., Wink — AIRPORT — City,
paving, lighting airport. $262,43
will help finance.

Tex., Winters—AIRPORT—City,
paving, lighting airport. $56,07
will help finance.

Tex., Woodville—AIRPORT—City
ing, paving, lighting airport. $87,3
will help finance.

★ **Tex., Yoakum**—AIRPORT—City,
paving, lighting airport. $812,51
will help finance.

Tex., Yorktown—AIRPORT—City
ing, paving, lighting airport. $139,
will help finance.

Tex., Ysleta—AIRPORT—City,
paving, lighting airport. $98,164. C
help finance.

Tex., Zavalla—AIRPORT—City,
paving, lighting airport. $109,79
will help finance.

Utah, American Fork—AIRPOR
grading, paving, lighting airport.
CAA will help finance.

Utah, Beaver—AIRPORT—City,
paving, lighting airport. $330,920. C
help finance.

Utah, Brigham—AIRPORT—City,
paving, lighting airport. $327,020. C
help finance.

Utah, Bryce Canyon—AIRPOR
grading, paving, lighting airport.
CAA will help finance.

Utah, Castle Dale—AIRPORT—City
ing, paving airport. $41,180. CA
help finance.

Utah, Cedar City—AIRPORT—City
ing, lighting airport. $28,400. CA
help finance.

Utah, Delta — AIRPORT — City,
paving, lighting airport. $76,600. C
help finance.

Utah, Duchesne—AIRPORT—City,
ing, paving, lighting airport.
CAA will help finance.

Utah, Enterprise—AIRPORT—City,
ing, paving airport. $38,500. CA
help finance.

Utah, Ephraim-Manti—AIRPORT
grading, paving, lighting airport.
CAA will help finance.

Utah, Escalante—AIRPORT—City,
ing, paving, lighting airport. $360,93
will help finance.

Utah, Fillmore—AIRPORT—City, g
paving, lighting airport. $247,970.
will help finance.

Utah, Fountain Green—AIRPORT
grading, paving, lighting airport.
CAA will help finance.

Utah, Grantsville—AIRPORT—City,
ing, paving, lighting airport. $84,000.
will help finance.

Utah, Green River—AIRPORT—City,
ing, paving, lighting airport. $74,750.
will help finance.

Utah, Gunnison-Salina—AIRPORT
grading, paving, lighting airport. $4
CAA will help finance.

Utah, Heber—AIRPORT—City, g
paving, lighting airport. $236,970.
will help finance.

Utah, Kanab—AIRPORT—City, g
paving, lighting airport. $357,970.
will help finance.

Utah, Lewiston-Richmond — AIRP
Cities, grading, paving airport. $
CAA will help finance.

Utah, Loa—AIRPORT—City, grading
port. **$38,360.** CAA will help finan

Utah, Lyndyl—AIRPORT—City, g
lighting, paving airport. $111,000. CA
help finance.

The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, tracks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearing and fewer sheaves, the saving on cable alone would eventually pay for it.

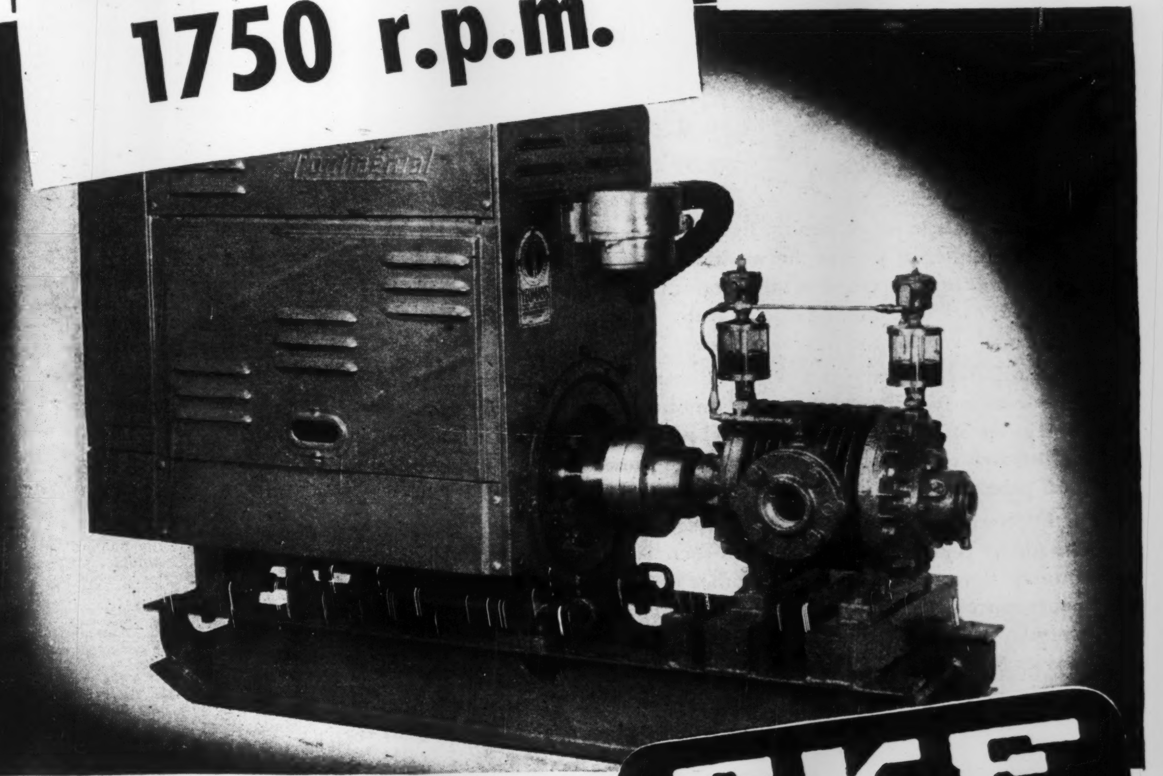
Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

McCAFFREY-RUDDOCK TAGLINE CORP.
2121 E. 25TH ST.
LOS ANGELES 11, CALIF.

RUD-O-MATIC
foolproof
TAGLINES

TRACTOR & MCHRY. CO. Atlanta, Ga.
A. H. COX & CO. Seattle
FORSYTHE EQUIP. CO. Long Island City, L. I.
COMLEY EQUIP. CO. Philadelphia, Pa.
W. E. PHILLIPS Detroit, Mich.
L. L. HANSON Chicago, Ill.
OWEN BUCKET CO. LT Berkeley, Calif.

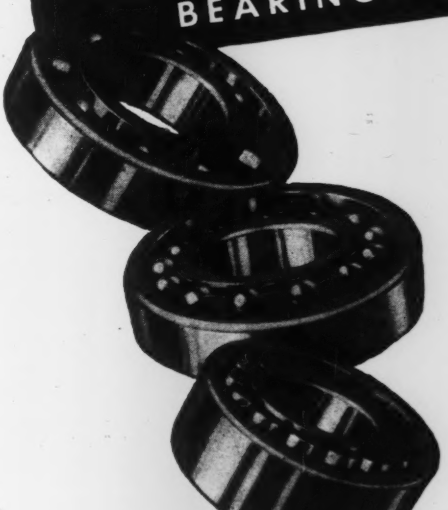
100 c.f.m. at 1750 r.p.m.



uilt by YEOMANS BROS. CO

SKF

BALL AND ROLLER BEARINGS



The long continuous performance of this sturdy, compact No. 60 Compressor proves that Yeomans engineers were right when they selected SKF Spherical Roller Bearings for vital rotating parts. Free from bearing trouble, this unit, driven by a 15 h.p. Continental gasoline engine, operates with a capacity of 100 c.f.m. at 1750 r.p.m., gauge pressure of 15 lbs. p.s.i. Self-aligning, self-contained, SKF's are designed to meet space limitations where the most capacity in the least space is desirable. Moreover, they never need adjustments . . . and never ask for more than occasional lubrication. Another good example for you to remember the next time you need bearings. 5773

SKF INDUSTRIES, INC., PHILA. 34, PA.

GENERALS RIDE IN JEEPS

STURDY little jeeps, strong, light and adaptable, are used for an endless number of jobs as the workhorses of the armed forces. Even the higher ranking officers, it is said, prefer them to their own heavier, more powerful cars. So generals ride in jeeps. They have wisely discarded the traditional way for the *functional way.*

Similarly, industry can wisely discard the traditional way for the functional way—discard the tradition of using pipe heavier than needed, for Taylor Spiral Pipe—a functional pipe. Like the jeep it is engineered right down to the job—doesn't carry an ounce of superfluous weight—is *all* pipe.

Of course you have always recognized the advantages of this light-but-sturdy pipe for special services such as long water lines over rough country, dredge lines and many other jobs where it fulfills the requirements supremely well. But the same rugged strength enables it to handle everyday services like those listed below—applications for which far heavier Standard Thickness pipe is too often used.

For such uses the light weight of Taylor Spiral Pipe saves in first cost, handling cost and erection cost—often cuts the installed cost to half that of a Standard Thickness piping job.

Changing to Taylor Spiral Pipe is made easy by the complete range of sizes, wall thicknesses and fittings.

Change to TAYLOR SPIRAL PIPE FOR . . . . .

- High and Low Pressure Water Lines
- Low Pressure Steam and Air Lines
- Steam and Diesel Exhaust Lines
- Vacuum and Suction Lines
- Sand and Gravel Lines
- Blower Piping
- Swing Pipe
- Spray Pond Piping
- Hydraulic Mining
- Dredge Lines

TAYLOR FORGE & PIPE WORKS

General Offices & Works: Chicago, P.O. Box 485 *New York Office:* 50 Church St.
Philadelphia Office: Broad Street Station Bldg.

TAYLOR
SPIRAL PIPE

POSTWAR PROJECT (Cont'd.)

Utah, Margum Pass—AIRPORT- grading airport. $38,500. CAA will finance.

Utah, Mexican Hat—AIRPORT- grading airport. $38,000. CAA wi finance.

Utah, Milford—AIRPORT—City, gr paving, lighting airport. $138,600. will help finance.

Utah, Moab—AIRPORT—City, gr paving, lighting airport. $367,590. will help finance.

Utah, Monticello-Blanding—AIRP Cities, grading, paving, lighting a **$248,320.** CAA will help finance.

Utah, Monument Valley—AIRP City, grading, paving, lighting a **$174,100.** CAA will help finance.

Utah, Morgan—AIRPORT—City, gr paving, lighting airport. $169,130. will help finance.

Utah, Mount Pleasant—AIRPORT- grading, paving, lighting airport. $1 CAA will help finance.

Utah, Natural Bridges—AIRPORT- grading airport. $78,300. CAA will finance.

Utah, Nephi—AIRPORT—City, gr paving, lighting airport. $182,540. will help finance.

★**Utah, Ogden**—AIRPORTS—City, ing, paving, lighting airport grading, paving, lighting airport grading, paving, lighting airport CAA will help finance. CD 2/14—ENR

Utah, Orderville-Mount Carmel- PORT—Cities, grading, paving, lightin port. **$188,000.** CAA will help financ

★**Utah, Panguitch**—AIRPORT—City, ing, paving, lighting airport. CAA will help finance.

Utah, Plateau Junction—AIRPORT- grading airport. $37,000. CAA wi finance.

Utah, Plymouth—AIRPORT—City, ing, paving, lighting airport. $96,500. will help finance.

★**Utah, Price**—AIRPORT—City, gr paving, lighting airport. $520,800. will help finance.

Utah, Rainbow Bridge—AIRPORT- grading, paving, lighting airport. CAA will help finance.

Utah, Richfield—AIRPORT—City, ing, paving, lighting airport. CAA will help finance.

Utah, Roosevelt—AIRPORT—City, ing, paving, lighting airport. CAA will help finance.

Utah, St. George-Hurricane—AIRP Cities, grading, paving, lighting a **$494,570.** CAA will help finance.

★**Utah, Salt Lake City**—AIRPORTS- grading, paving, lighting airport **700,** grading, paving, lighting airport **260,** grading, paving, lighting airport **570,** grading, paving, lighting airport **450.**

Utah, Soldier Summit—AIRPORT- grading, paving airport. $53,900. CAA help finance.

Utah, Spanish Fork — AIRPORT - grading, paving, lighting airport. CAA will help finance.

Utah, Strawberry—AIRPORT—City, ing, paving, lighting airport. $146,180. will help finance.

Utah, Thompsons—AIRPORT—City, ing, paving, lighting airport. $132,030. will help finance.

Utah, Tooele—AIRPORT—City, gr paving, lighting airport. $425,970. CAA help finance.

Utah, Torrey—AIRPORT—City, gr paving, lighting airport. $171,800. CAA help finance.

Utah, Tropic—AIRPORT—City, gr airport. **$75,300.** CAA will help finance

Utah, Vernal—AIRPORT—City, gr paving, lighting airport. $426,470. CAA help finance.

Utah, Wellsville-Hyrun—AIRPORT- ies, grading, paving airport. $29,180. will help finance.

Utah, Woodside—AIRPORT—City, ing, paving airport. **$39,980.** CAA will finance.

Vt., Bellows Falls—AIRPORT—City, ing, airport. **$269,000.** CAA will help fi

Vt., Bennington—AIRPORT—City, ing, paving, lighting airport. $272,000. will help finance.

Vt., Berkshire—AIRPORT—City, gr paving airport. **$210,000.** CAA wi finance.

Vt., Berlin—AIRPORT—City, grading ing, lighting airport. $157,000. CAA help finance.

Vt., Brandon—AIRPORT—City, gr airport. **$157,000.** CAA will help finan

★**Vt., Brattleboro**—AIRPORT—City, ing, paving, lighting airport. CAA will help finance.

Vt., Brighton—AIRPORT—City, gr airport. **$226,000.** CAA will help finance

ORETRENCH NOTES ON COMPARATIVE WELLPOINT COSTS

The use of any wellpoint dewatering system involves three major expense items:

1. **The purchase or rental price of *sufficient equipment* to dewater the job *below sub-grade.***
2. **The cost of wellpoint installation and reinstallation as the job progresses.**
3. **The cost of operation.**

★ ★ ★

A western Engineer had a good portable pump and a water tank. He also had a sample Moretrench Wellpoint and another make of jetting wellpoint. He thought the latter was just as good. We sicked him on to make a test and he went at it.

The final score was that the Moretrench point went down in 44% less time, used 45.6% less jetting water out of the tank, and, when pumped, put 64% more water per minute back in. He held the watch, too. Called it "a definite superiority for your wellpoint."

Now what would be the practical results of this superiority on a job? We could tell you of many instances, but the following one is well authenticated and for a sample it will do.

The contractor for a big army camp had 110 miles of wet trench to dig and for a start put on one Moretrench outfit. He then installed a dozen or so of other make units and thought he was set to go to town. But, the daily footage records for the "come latelys" were not too good, so we got a big order.

With a 100% Moretrench plant the pumping cost was cut in two, and ninety-five miles of wet trench were finished in three months.

The practical result was a saving of about a million dollars, and months of desperately needed time.

Some people have to have comparative wellpoint experience in order to find out that a cheap first cost seldom gets them "over the hump". Some people take our word for it. Some people never know.

ST IS CHEAP INSURANCE. WE ARE ALWAYS READY. ANYBODY WANT TO BET?

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ORLEANS 13, LA.

ROCKAWAY, NEW JERSEY

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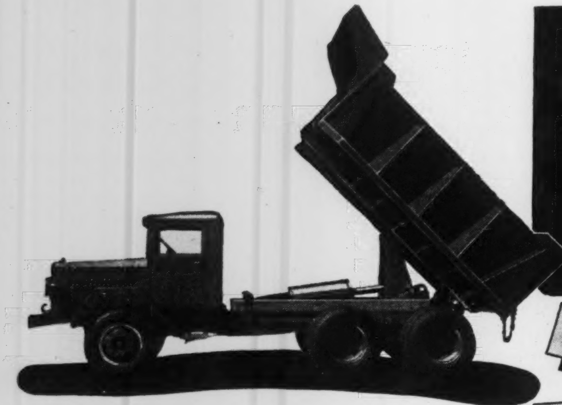
CHICAGO 23, ILL.



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HERCULES
DELIVERS
ALL THESE
features

CENTER-LIFT HOIST

REVERSIBLE TAILGATE HARDWARE

PISTON-TYPE CONTROL VALVE

HOIST MOUNTS ABOVE FRAME

EASY-REACH TAILGATE LEVER

ACCESSIBLE HOIST CYLINDER

DASH CONTROLS FOR HOIST AND TAKE-OFF

PATENTED TIRE AND TOOL PACK

Bigger payloads unloaded faster—less maintenance—greater profits—these are the advantages of Hercules construction . . . advantages that make Hercules dump bodies worth waiting for!

While you're waiting, your Hercules distributor can be of service, keeping your present equipment in top working order. He has the mechanical facilities, the replacement parts and the trained personnel needed to maintain your overworked equipment.

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DUMP BODIES AND HYDRAULIC HOISTS
SPLIT SHAFT POWER TAKE-OFFS • COAL CONVEYORS

HERCULES STEEL PRODUCTS COMPANY . . . GALION, OHIO

"BUFF" splendor of achievement for 78 years will establish for the purchaser—a dignity and position rich in prestige.

Rental Transits — Reasonable Rates. Send for handsome new catalog #491

BUFF & BUFF INSTITUTE
J. P., Boston, Mass.

The BUFF "X" TELESCOPE

has the finest and highest definition and simplest lens system. It is useful when the light is dim.

C. L. FIELDER Co.
ROANOKE, VIRGINIA
FABRICATORS and ERECTORS
of WELDED STEEL STRUCTURES
Specializing in
Industrial Buildings—Bridges—Steel Structures—Conveyors—Bins—Mine Structures—Misc. and Ornamental Iron Steel Plate Products.

POSTWAR PROJECTS (Cont'd)

Vt., Bristol — AIRPORT — City,
paving, lighting airport. $398,000. C
help finance.

★ **Vt., Burlington** AIRPORTS—City
ing, paving air $46,000, gradi
ing lighting airport $563,000. CAA w
finance.

Vt., Canaan — AIRPORT — City,
imprv. airport. $181,000. CAA w
finance.

★ **Vt., Enosburg Falls** — AIRPORT
grading, paving, lighting
$553,000. CAA will help finance.

Vt., Essex—AIRPORT—City, gradi
port. $181,000. CAA will help finan

Vt., Fair Haven—AIRPORT—City,
ing, paving, lighting airport. $327,00
will help finance.

Vt., Fairlee — AIRPORT — City,
paving, lighting airport. $305,000.
will help finance.

★ **Vt., Grand Isle**—AIRPORT—City,
ing, paving, lighting airport.
CAA will help finance.

★ **Vt., Hardwick**—AIRPORT—City,
ing, paving, lighting airport.
CAA will help finance.

Vt., Ludlow — AIRPORT — City,
improving airport. $136,000. CAA w
finance.

★ **Vt., Lyndonville**—AIRPORT—City,
ing, paving, lighting airport.
CAA will help finance.

Vt., Manchester—AIRPORT—City,
ing, imprv. airport. $210,000. CA
help finance.

Vt., Middlebury — AIRPORT — City
ing, paving, lighting airport.
CAA will help finance.

Vt., Middletown—AIRPORT—City,
ing airport. $157,000. CAA will
finance.

Vt., Milton—AIRPORT—City, gradi
proving airport. $157,000. CAA wi
finance.

★ **Vt., Morrisville-Stowe**—AIRPORT—
grading, paving, lighting
$548,000. CAA will help finance.

Vt., Newport — AIRPORT — City,
paving, lighting airport. $477,000. CA
help finance.

Vt., Randolph—AIRPORT—City,
paving, lighting airport. $305,000.
will help finance.

★ **Vt., Richford**—AIRPORT—City,
paving, lighting airport. $615,000.
will help finance.

Vt., Rutland—AIRPORT—City,
paving, lighting airport. $229,000.
will help finance.

★ **Vt., St. Albans**—AIRPORT—City
ing, paving, lighting airport.
CAA will help finance.

Vt., Springfield—AIRPORT—City,
imprv. airport. $123,000. CAA wi
finance.

Vt., Swanton—AIRPORT—City,
imprv. airport. $112,000. CAA wi
finance.

Vt., Troy — AIRPORT — City,
imprv. airport. $340,000. CAA wi
finance.

★ **Vt., Vergennes**—AIRPORT—City,
ing, paving, lighting airport.
CAA will help finance.

Vt., Warren—AIRPORT—City,
imprv. airport. $340,000. CAA wi
finance.

★ **Vt., Wilmington**—AIRPORT—City,
ing, paving, lighting airport.
CAA will help finance.

Va., Abingdon—AIRPORT—City,
lighting airport. $62,000. CAA wi
finance.

Va., Alexandria—AIRPORT—City
ing, paving, lighting airport. $233,000.
will help finance.

Va., Amelia—AIRPORT—City,
lighting airport. $61,000. CAA wi
finance.

Va., Amherst—AIRPORT—City,
lighting airport. $69,000. CAA wi
finance.

Va., Appomatox—AIRPORT—City
ing, lighting airport. $52,000. CAA wi
finance.

Va., Ashland—AIRPORT—City,
lighting airport. $57,000. CAA wi
finance.

Va., Bassett—AIRPORT—City,
lighting airport. $67,000. CAA wi
finance.

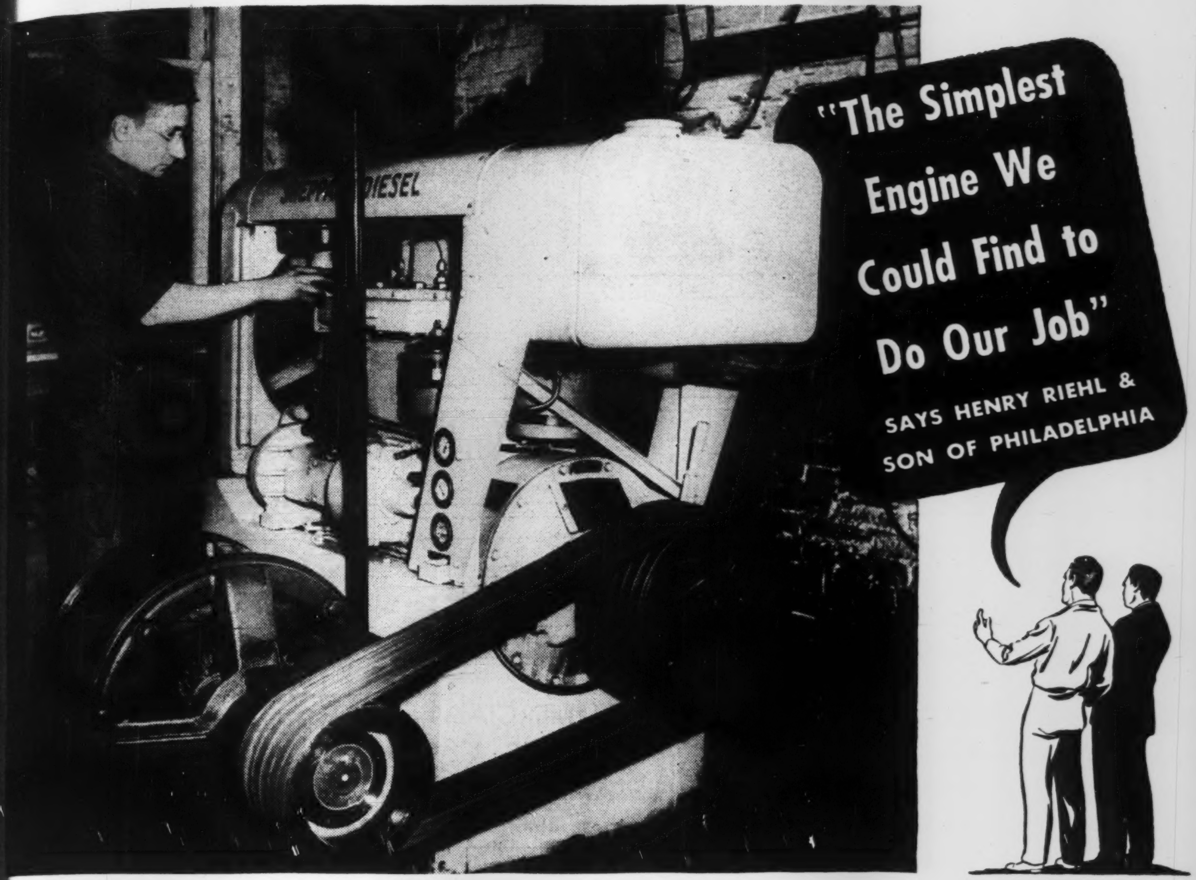
Va., Bedford—AIRPORT—City,
paving, lighting airport. $318,000. CAA
help finance.

Va., Berryville—AIRPORT—City,
lighting airport. $49,000. CAA wi
finance.

Va., Big Stone Gap—AIRPORT—
grading, paving, lighting airport.
CAA will help finance.

★ **Va., Blackburg**—AIRPORT—City,
ing, paving, lighting airport.
CAA will help finance.

Va., Bland—AIRPORT—City,
lighting airport. $82,000. CAA wi
finance.


SHEPPARD DIESEL
"The Simplest Engine We Could Find to Do Our Job"
SAYS HENRY RIEHL & SON OF PHILADELPHIA

"POWER for the entire machine shop of Henry Riehl & Son of Philadelphia, Pennsylvania, is supplied by one Model #6 25-horsepower, Sheppard Diesel which was installed in June, 1941, and has been running nine hours a day, six days a week, ever since. The company manufactures narrow fabric textile machinery, working in both metal and wood. The various machine shops are housed in several adjoining buildings and on several floors, and contain both standard and special woodworking machines as well as a completely equipped machine shop. There is a total of eighty machines, the power for all of which is supplied by the Sheppard Diesel. (Note: The machines are never all in operation at the same time.) The Sheppard Diesel was chosen because, in the words of Theodore H. Wagner, one of the partners in the firm, 'it was the simplest engine we could find that would do the work.' Moreover, their own employees are able to fix minor troubles when and if they arise, without the necessity of calling in experts for maintenance work.

"Dependability, cheapness of power, low maintenance cost and quick starting, with power available when needed and shut off when not needed, were the characteristics required by Henry Riehl & Son, and the Sheppard Diesel amply fills these requirements. No other engine was previously used for power, and commercial power could readily be bought, but at greatly increased cost. Figures are not available to demonstrate accurately the savings that have been realized, but Mr. Wagner states that 'the Sheppard Diesel has paid for itself in the time we have had it.' When asked the opinion of the plant management concerning the performance of this engine, Mr. Wagner said, 'we think so much of it that we're going to order a larger unit.' He had particular praise for the efficiency and promptness of the Service Department of R. H. Sheppard Company.

"Last December the engine was overhauled, after three and a half years of service, and is now in new working condition. Apart from this overhaul, there has been no major expense for maintenance or repair."

Your priority may entitle *you* to a Diesel right now. Do as Riehl did—specify Sheppard and let the Diesel pay for itself. Write today for free bulletins and advice about obtaining WPB approval.

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POSTWAR PROJECTS (Cont'd.)

Va., Boissevain—AIRPORT—City, grad lighting airport. **$77,000**. CAA will h finance.

Va., Bonny Blue—AIRPORT—City, gr ing, lighting airport. **$97,000**. CAA will h finance.

Va., Bristol—AIRPORT—City, grad paving, lighting airport **$403,000**. CAA help finance.

Va., Buckingham—AIRPORT—City, gr ing, lighting airport. **$55,000**. CAA will h finance.

Va., Cape Charles—AIRPORT—City, gr ing, paving, lighting airport. **$258,000**. C will help finance.

Va., Charles City—AIRPORT—City, gr ing, lighting airport. **$38,000**. CAA will h finance.

Va., Charlotte Court House—AIRPOR City, grading, lighting airport. **$52,000**. C will help finance.

★ **Va., Charlottesville** — AIRPORT — C grading, paving, lighting airp **$778,000.** CAA will help finance.

Va., Chase City—AIRPORT—City, gr ing, paving, lighting airport. **$295,000**. C will help finance.

Va., Chatham—AIRPORT—City, grad lighting airport. **$41,000**. CAA will h finance.

Va., Chester—AIRPORT—City, grad lighting airport. **$44,000**. CAA will h finance.

Va., Chilhowie—AIRPORT—City, grad paving, lighting airport. **$295,000**. C will help finance.

Va., Clinchee—AIRPORT—City, grad lighting airport. **$87,000**. CAA will h finance.

Va., Colonial Beach — AIRPORT — C grading, lighting airport. **$41,000**. CAA help finance.

Va., Courtland—AIRPORT—City, grad lighting airport. **$41,000**. CAA will h finance.

Va., Covington—AIRPORT—City, grad paving, lighting airport. **$413,000**. C will help finance.

Va., Craigsville—AIRPORT—City, grad lighting airport. **$69,000**. CAA will h finance.

Va., Crewe — AIRPORT — City, grad lighting airport. **$27,000**. CAA will h finance.

Va., Christianburg—AIRPORT—City, gr ing, lighting airport. **$67,000**. CAA help finance.

Va., Culpeper—AIRPORT—City, grad paving, lighting airport. **$283,000**. C will help finance.

Va., Cumberland—AIRPORT—City, gr ing, lighting airport. **$35,000**. CAA help finance.

Va., Damascus—AIRPORT—City, grad lighting airport. **$87,000**. CAA will h finance.

Va., Dante — AIRPORT — City, grad lighting airport. **$97,000**. CAA will h finance.

Va., Dinwiddie—AIRPORT—City, grad lighting airport. **$50,000**. CAA will h finance.

Va., Elton — AIRPORT — City, grad lighting airport. **$46,000**. CAA will h finance.

Va., Fairfax—AIRPORT—City, grad lighting airport. **$57,000**. CAA will h finance.

Va., Falls Church—AIRPORT—City, gr ing, lighting airport. **$46,000**. CAA will h finance.

Va., Farmville—AIRPORT—City, grad paving, lighting airport. **$291,000**. C will help finance.

Va., Fincastle—AIRPORT—City, grad lighting airport. **$51,000**. CAA will h finance.

Va., Floyd — AIRPORT — City, grad lighting airport. **$77,000**. CAA will h finance.

★ **Va., Fredericksburg** — AIRPORT — C grading, paving, lighting airport. **$** **000.** CAA will help finance.

Va., Front Royal—AIRPORT—City, gr ing, lighting airport. **$77,000**. CAA help finance.

Va., Galax—AIRPORT—City, grad paving, lighting airport. **$343,000**. C will help finance.

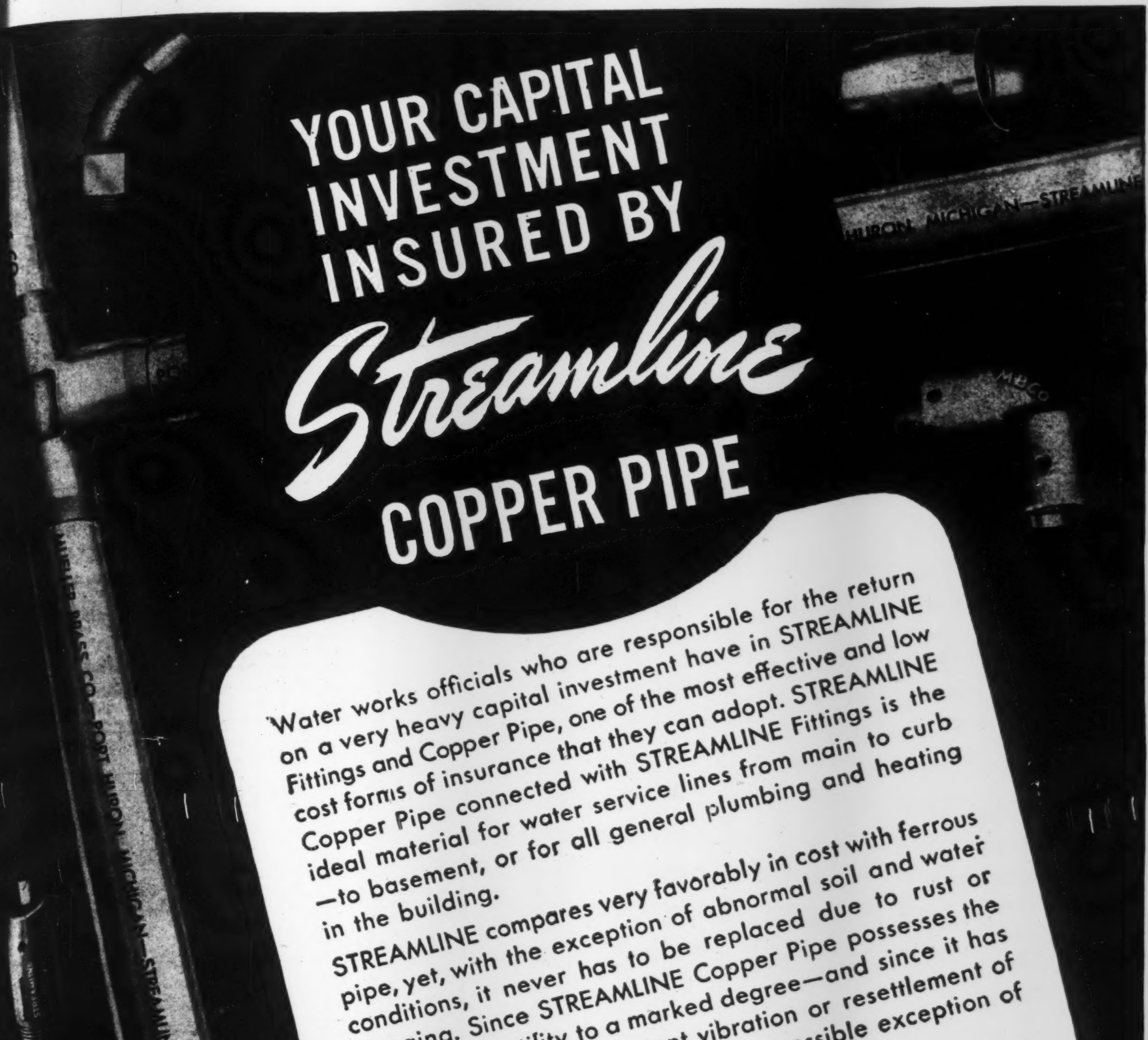
Va., Gate City—AIRPORT—City, grad lighting airport. **$92,000**. CAA will h finance.

Va., Gloucester—AIRPORT—City, grad lighting airport. **$35,000**. CAA will h finance.

Va., Goochland—AIRPORT—City, gr ing, lighting airport. **$48,000**. CAA help finance.

Va., Gordonsville—AIRPORTS—City, gr ing, paving, lighting airport **$265,000**; gr ing, lighting airport **$46,000**. CAA will h finance.

Va., Grundy—AIRPORT—City, grad lighting airport. **$82,000**. CAA will h finance.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YOUR CAPITAL INVESTMENT INSURED BY *Streamline* COPPER PIPE

Water works officials who are responsible for the return on a very heavy capital investment have in STREAMLINE Fittings and Copper Pipe, one of the most effective and low cost forms of insurance that they can adopt. STREAMLINE Copper Pipe connected with STREAMLINE Fittings is the ideal material for water service lines from main to curb —to basement, or for all general plumbing and heating in the building.

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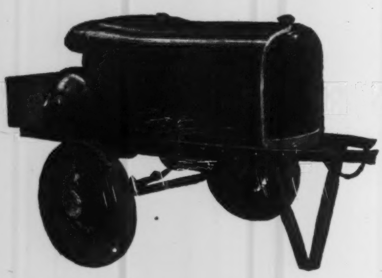

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POSTWAR PROJECTS (Cont'd.)

Va., Harcum—AIRPORT—City, grading, lighting airport. **$33,000.** CAA will help finance.

Va., Harrisonburg—AIRPORT—City, grading, paving, lighting airport. **$303,000.** CAA will help finance.

Va., Hillsville—AIRPORT—City, grading, lighting airport. **$82,000.** CAA will help finance.

Va., Hopewell—AIRPORT—City, grading, paving, lighting airport. **$273,000.** CAA will help finance.

Va., Hot Springs—AIRPORT—City, grading, paving, lighting airport. **$380,000.** CAA will help finance.

Va., Independence — AIRPORT — City, grading, lighting airport. **$79,000.** CAA will help finance.

Va., Ivanhoe—AIRPORT—City, grading, lighting airport. **$77,000.** CAA will help finance.

Va., Jewell Valley—AIRPORT—City, grading, lighting airport. **$79,000.** CAA will help finance.

Va., Kecoughtan—AIRPORT—City, grading, paving, lighting airport. **$293,000.** CAA will help finance.

Va., King George—AIRPORT—City, grading, lighting airport. **$40,000.** CAA will help finance.

Va., King William—AIRPORT—City, grading, lighting airport. **$40,000.** CAA will help finance.

Va., Lawrenceville—AIRPORT—City, grading, paving, lighting airport. **$255,000.** CAA will help finance.

Va., Lebanon—AIRPORT—City, grading, lighting airport. **$85,000.** CAA will help finance.

Va., Leesburg—AIRPORT—City, grading, paving, lighting airport. **$299,000.** CAA will help finance.

Va., Lexington—AIRPORT—City, grading, paving, lighting airport. **$413,000.** CAA will help finance.

Va., Lively — AIRPORT — City, grading, paving, lighting airport. **$243,000.** CAA will help finance.

Va., Louisa — AIRPORT — City, grading, lighting airport. **$44,000.** CAA will help finance.

Va., Lovingston—AIRPORT—City, grading, lighting airport. **$40,000.** CAA will help finance.

Va., Luray — AIRPORT — City, grading, lighting airport. **$64,000.** CAA will help finance.

Va., Madison—AIRPORT—City, grading, lighting airport. **$46,000.** CAA will help finance.

Va., Manassas—AIRPORT—City, grading, lighting airport. **$37,000.** CAA will help finance.

Va., Marion — AIRPORT — City, grading, paving, lighting airport. **$493,000.** CAA will help finance.

Va., Martinsville—AIRPORT—City, grading, paving, lighting airport. **$443,000.** CAA will help finance.

Va., Mathews—AIRPORT—City, grading, lighting airport. **$35,000.** CAA will help finance.

Va., Messick — AIRPORT — City, grading, lighting airport. **$35,000.** CAA will help finance.

Va., Milford — AIRPORT — City, grading, lighting, paving airport. **$255,000.** CAA will help finance.

Va., Monterey—AIRPORT—City, grading, lighting airport. **$69,000.** CAA will help finance.

Va., Narrows—AIRPORT—City, grading, lighting airport. **$85,000.** CAA will help finance.

Va., New Castle—AIRPORT—City, grading, lighting airport. **$67,000.** CAA will help finance.

Va., New Market—AIRPORT—City, grading, lighting airport. **$50,000.** CAA will help finance.

★**Va., Newport News** — AIRPORT — City, grading, paving, lighting airport. **$808,000.** CAA will help finance.

★**Va., Norton**—AIRPORT—City, grading, paving, lighting airport. **$543,000.** CAA will help finance.

Va., Onancock—AIRPORT—City, grading, lighting airport. **$46,000.** CAA will help finance.

Va., Orange—AIRPORT—City, grading, lighting airport. **$75,000.** CAA will help finance.

Va., Palymra—AIRPORT—City, grading, lighting airport. **$46,000.** CAA will help finance.

Va., Parksley—AIRPORT—City, grading, paving, lighting airport. **$255,000.** CAA will help finance.

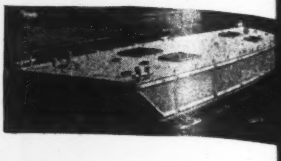
Va., Pennington—AIRPORT—City, grading, lighting airport. **$82,000.** CAA will help finance.

Va., Petersburg—AIRPORT—City, imprv. airport. **$30,000.** CAA will help finance.

★**Va., Portsmouth**—AIRPORT—City, grading, paving, lighting airport. **$900,000.** CAA will help finance.

★ BOLTED
SECTIONAL STE

BARGES
& HULLS



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or rail, and overseas as hold carg
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cargo. 500 tons up. Outboard mot
makes self-propelled units.

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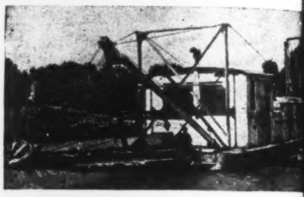

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dredges 8 inches up. All dredge
have bolted sectional steel hull
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● All over the world, where the going is toughest, the M1A1 Army heavy wrecker has earned its reputation as the biggest, toughest, pullin'-est bruiser on wheels. These super trucks, built by Ward LaFrance Truck Division for the Ordnance Department, are used for such jobs as tank recovery, motor vehicle rescue, lifting and carrying disabled bombers. They operate in the mire of European swamps . . . the muck of Asiatic jungles. To the M1A1 wrecker, a road is a convenience, rather than a necessity . . . In the near future, Ward LaFrance commercial trucks and tractors will again appear on America's highways. These Ward LaFrance over-the-road trucks and tractors are designed to haul pay loads faster and more economically than ever before. They are not streamlined like a sport coupe, but they look like what they are: the biggest, toughest, sturdiest motor trucks on the highway. They are backed by the twenty-five year Ward LaFrance reputation for building great trucks, further proved by unbeatable performance all over the world.

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TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC.

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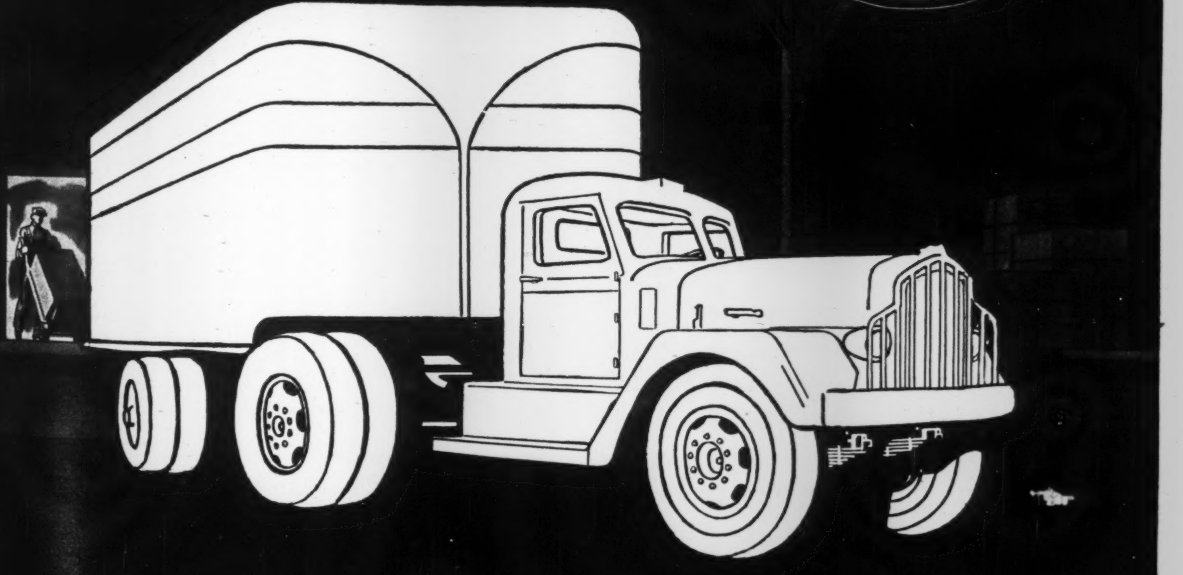

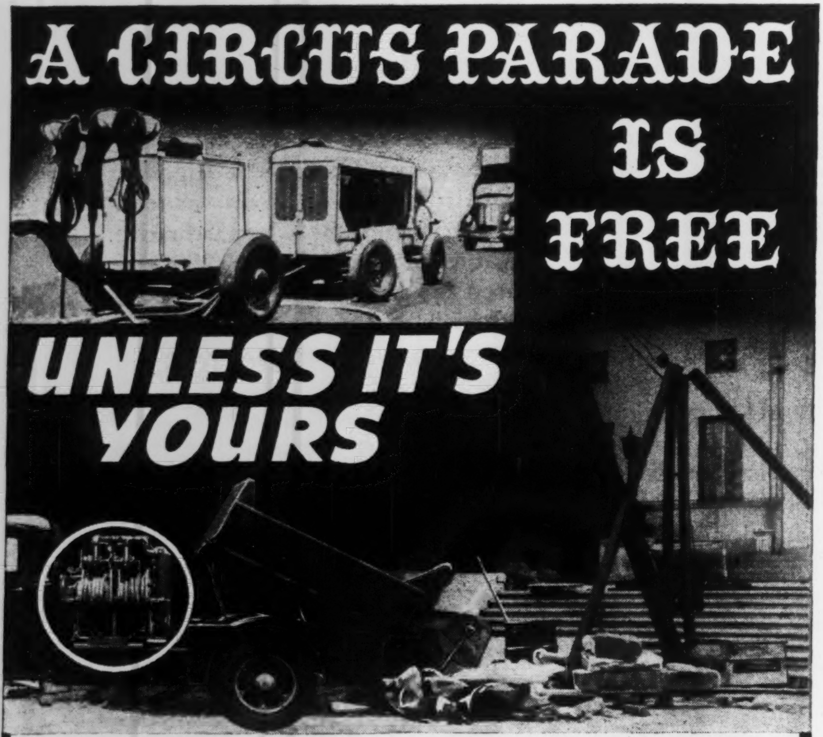

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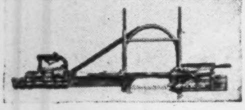
And if the one at the top is *yours,* you can bet it's costing you plenty — both in time and money — to do jobs like the one illustrated.

Why waste men and equipment, especially in the face of present shortages, to repair a highway break-up, do emergency welding on the job or accomplish any other relatively short construction job, when the mobile, self-contained Davey unit can do it in less time — at a fraction of the cost.

Only Davey can give your truck this versatile combination equipment engineered as a unit. Select one of these three units — the Davey Auto-Air Compressor, the Compressor-Welder, or the Compressor-Welder-Lighting Generator — mounted on your truck and driven by the truck engine through the Davey Heavy-Duty Truck Power Take-Off, and you have ***mobile*** equipment that swiftly conveys crew, tools and materials . . . provides *immediate* compressed air or electric power for welding or lighting.

CONTRACTORS EVERYWHERE CAN USE THE DAVEY PNEUMATIC SAW



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Under or above water operation • straight-edge cuts • clamping device which supports weight of saw • performance in any weather • rugged construction for speed and long service • standard cross-cut teeth are easily sharpened.

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DEALERS IN PRINCIPAL CITIES

POSTWAR PROJECTS (Cont'd)

Va., Powhattan—AIRPORT—City, gr
ing, lighting airport. $50,000. CAA
help finance.

Va., Prince George — AIRPORT — C
grading, lighting airport. $35,000. CAA
help finance.

Va., Pulaski—AIRPORT—City, gradi
paving, lighting airport. $225,000. C
will help finance.

Va., Quantico—AIRPORT—City, gradi
lighting airport. $35,000. CAA will h
finance.

Va., Radford—AIRPORT—City, gradi
paving, lighting airport. $463,000. C
will help finance.

Va., Reedville—AIRPORT—City, gradi
lighting airport. $40,000. CAA will h
finance.

Va., Richlands—AIRPORT—City, gradi
lighting airport. $92,000. CAA will h
finance.

★**Va., Richmond**—AIRPORT—City, gr
ing, paving, lighting airport. $1,020,0
CAA will help finance. CD [illegible]—E
10/14/43.

Va., Rockymount—AIRPORT—City, gr
ing, lighting airport. $77,000. CAA
help finance.

Va., Roda — AIRPORT — City, gradi
lighting airport. $95,000. CAA will h
finance.

Va., Salem—AIRPORT—City, gradi
paving, lighting airport. $343,000. CAA
help finance.

Va., Saltville—AIRPORT—City, gradi
lighting airport. $75,000. CAA will h
finance.

Va., Saluda—AIRPORT—City, gradi
lighting airport. $38,000. CAA will h
finance.

Va., Shenandoah—AIRPORT—City, gr
ing, lighting airport. $60,000. CAA will h
finance.

Va., Smithfield—AIRPORT—City, gradi
lighting airport. $40,000. CAA will h
finance.

Va., South Boston—AIRPORT—City, gr
ing, lighting, paving airport. $279,000. C
will help finance.

Va., South Hill—AIRPORT—City, gradi
lighting paving, $295,000. CAA will h
finance.

Va., Spotsylvania—AIRPORT—City, gr
ing, paving airport. $65,000. CAA will h
finance.

Va., Standardsville — AIRPORT—C
grading, lighting airport. $57,000. CAA
help finance.

Va., Staunton—AIRPORT—City, gradi
lighting, paving airport. $333,000. CAA
help finance.

Va., Strasburg—AIRPORT—City, gradi
lighting airport. $57,000. CAA will h
finance.

Va., Stuart—AIRPORT—City, gradi
lighting airport. $79,000. CAA will h
finance.

Va., Suffolk—AIRPORT—City, imprv. a
port. $25,000. CAA will help finance.

Va., Surry—AIRPORT—City, gradi
lighting airport. $40,000. CAA will h
finance.

Va., Tappahannock — AIRPORT — C
grading, lighting airport. $46,000. CAA
help finance.

★**Va., Tazewell**—AIRPORT—City, gradi
paving, lighting airport. $533,000. C
will help finance.

Va., Victoria—AIRPORT—City, gradi
paving, lighting airport. $61,000. CAA
help finance.

Va., Vienna—AIRPORT—City, gradi
lighting, paving airport. $57,000. CAA
help finance.

Va., Vinton—AIRPORT—City, gradi
lighting airport. $57,000. CAA will h
finance.

Va., Virginia Beach—AIRPORT—C
grading, paving, lighting airport. $251,
CAA will help finance.

Va., Warrenton—AIRPORT—City, gradi
lighting airport. $40,000. CAA will h
finance.

Va., Washington—AIRPORT—City, gr
ing, lighting airport. $35,000. CAA will h
finance.

Va., Waverly—AIRPORT—City, gradi
lighting airport. $30,000. CAA will h
finance.

Va., Waynesboro—AIRPORT—City, gr
ing, paving, lighting airport. $243,000. CA
will help finance.

Va., Weirwood—AIRPORT—City, gradi
lighting airport. $35,000. CAA will h
finance.

Va., Williamsburg—AIRPORT—City, gr
ing, paving, lighting airport. $263,000. CA
will help finance.

Va., Winchester—AIRPORT—City, gr
ing, paving, lighting airport. $323,000. CA
will help finance.

Va., Woodstock—AIRPORT—City, gr
ing, paving, lighting airport. $363,000. CA
will help finance.

Va., Wytheville—AIRPORT—City, gradi
paving, lighting airport. $493,000. CAA
help finance.

12 C.Y. DIGGING
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SEEING a Page AUTOMATIC bucket in actual operation is more convincing than a thousand words. It ALWAYS lands with all weight on the teeth . . . it digs at first pull of the load line without resting on its bottom . . . and loads within only one or two bucket lengths!

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POSTWAR PROJECTS (Cont'd) –

Va., Yorktown—AIRPORT—City, gra lighting airport. $57,000. CAA will finance.

Wash., Anacortes—AIRPORT—City ing, paving, lighting airport. $449,000. will help finance.

Wash., Beverly—AIRPORT—City, gra airport. **$60,000.** CAA will help finance

Wash., Bothell—AIRPORT—City, gra airport. **$50,000.** CAA will help finance

Wash., Burton-Vashon—AIRPORT—C grading airport. **$195,000.** CAA will finance.

Wash., Chehalis-Centralia — AIRPORT Cities, grading, paving, lighting air **$106,000.** CAA will help finance.

Wash., Chelan—AIRPORT—City, gra paving, lighting airport. $394,000. CAA help finance.

Wash., Cheney—AIRPORT—City, air grading, lighting, etc. $147,000. CAA help finance.

Wash., Chewelah—AIRPORT—City, ing, paving, lighting airport. $322,000. will help finance.

Wash., Clarkston—AIRPORT—City, ing, paving airport. **$140,000.** CAA will finance.

Wash., Cle Elum—AIRPORT—City, ing, lighting airport. $110,000. CAA help finance.

Wash., Colfax—AIRPORT—City, gra paving airport. **$275,000.** CAA will finance.

Wash., College Place—AIRPORT— grading airport. **$60,000.** CAA will hel nance.

Wash., Colville—AIRPORT—City, gra paving, lighting airport. $410,000. CAA help finance.

Wash., Connell—AIRPORT—City, gra lighting airport. **$98,000.** CAA will finance.

Wash., Darrington—AIRPORT—C grading airport. **$150,000.** CAA will finance.

Wash., Dayton—AIRPORT—City, gra airport. **$135,000.** CAA will help fina

Wash., Deer Park—AIRPORT—City, li ing airport. **$32,000.** CAA will help fina

Wash., Easton—AIRPORT—City, gra lighting airport. **$50,000.** CAA will finance.

Wash., Enumclaw—AIRPORT—City, g ing, lighting airport. **$170,000.** CAA help finance.

Wash., Everett—AIRPORT—City, gra lighting airport. **$285,000.** CAA will finance.

Wash., Forks—AIRPORT—City, gra airport. **$160,000.** CAA will help finance

Wash., Friday Harbor—AIRPORT—C grading, lighting airport. $225,000. C will help finance.

Wash., Gig Harbor—AIRPORT—C grading airport. **$135,000.** CAA will finance.

Wash., Glenwood—AIRPORT—City, g ing airport. **$85,000.** CAA will help fina

Wash., Goldendale—AIRPORT—C grading, lighting airport. $200,000. C will help finannce.

Wash., Harrington—AIRPORT—C grading, paving, lighting airport. $265, CAA will help finance.

Wash., Horse Heaven—AIRPORT—C grading airport. **$70,000.** CAA will finance.

Wash., Issaquah—AIRPORT—City, g ing airport. **$40,000.** CAA will help fina

Wash., Kelso-Longview—AIRPORTS—C ies. grading, paving, lighting airport. $4 000. CAA will help finance.

Wash., Kent—AIRPORT—City, gra airport. **$30,000.** CAA will help finance

Wash., La Crosse—AIRPORT—City, g ing airport. **$90,000.** CAA will help fina

Wash., Lakebay—AIRPORT—City, g ing airport. **$100,000.** CAA will help fina

Wash., Leavenworth—AIRPORT—C grading, lighting airport. $140,000. C will help finance.

Wash., Lind—AIRPORT—City, gra airport. **$50,000.** CAA will help finance

Wash., Long Beach—AIRPORT—C grading, paving, lighting airport. $30 CAA will help finance.

Wash., Mason City—AIRPORT—C grading airport. **$195,000.** CAA will finance.

Wash., Metaline Falls—AIRPORT—C grading airport. **$75,000.** CAA will finance.

Wash., Monroe—AIRPORT—City, gra airport. **$165,000.** CAA will help finance

Wash., Montesano-Elma—AIRPORT Cities, grading airport. $180,000. CAA help finance.

Wash., Mount Baker—AIRPORT—C grading airport. **$220,000.** CAA will finance.

Wash., Mount Ranier—AIRPORT—C grading airport. **$350,000.** CAA will finance.

What's
ur highway and irfield construction
PROBLEM

E SEAMAN PULVI-MIXER AY BE YOUR ANSWER!

★

s that couldn't be done; jobs that were costly and ficult; jobs that involved so much equipment and so y man-hours that the work was left unattended; — e are the jobs (and a multitude of different kinds) ch today, are often readily and economically solved the SEAMAN MIXER.

ce doesn't permit a full description; — hence this ck-list. Look it over and write for details.

ulverizing old, rough sod to d and prepare for re-seeding.

reparing—in one tractor trip perfect seed-bed for grass or planting.

aster, more economical, more ugh in place mixing of road rials.

Aeration of aggregate; — of inous mix; or to dry out a muddy field condition.

ulverization of scarified, old inous material to reduce to nal aggregate size for re- ng.

☐ Quicker, more economical bituminous stock-pile mixing.

☐ Doubling yardage in widening shoulders using existing shoulder aggregate.

☐ Bituminous highway or runway maintenance.

☐ Pulverizing hard, frozen snow drifts.

☐ Removing ice from runways, streets, highways.

☐ Roadside mulching.

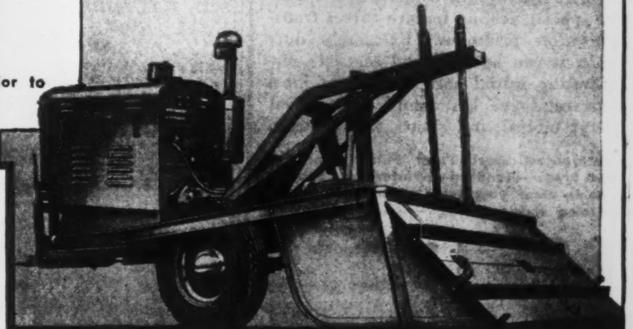
☐ Pulverization of soils prior to compaction in earth work.

1. Pulverizing rough, uneven sod to level and prepare for new seeding.

2. Mixing 6" bituminous base course for airfield runway.

3. Clearing land of weeds and brush and removing tangled root systems.

Highway and airfield engineers cite the SEAMAN PULVI-MIXER as the most comprehensive and useful equipment ever developed. A study of its astonishingly wide range of uses will be of profit to engineers, contractors and those directly concerned with airfield maintenance.



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In this profusely illustrated book, Soil Stabilization Methods, compiled by Seaman engineers, will be found a description of modern practices in this field—and a detailed account of many uses for the SEAMAN MIXER. Write for your copy. Ask for Bulletin R-24.

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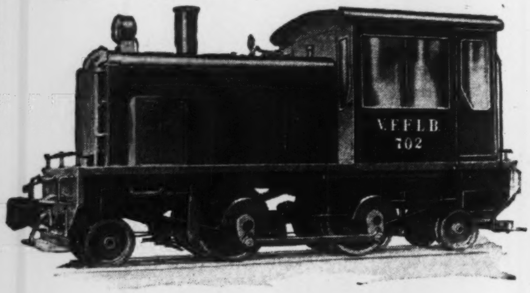

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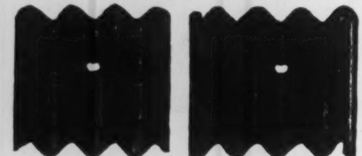

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Wash., Newport—AIRPORT—City,
ing airport. **$50,000.** CAA will help

Wash., North Bend — AIRPORT —
grading, lighting airport. $150,000.
will help finance.

Wash., Oroville—AIRPORT—City, gra
paving, lighting airport. $206,000.
will help finance.

Wash., Pacific Beach—AIRPORT—
grading airport. **$250,000.** CAA will
finance.

Wash., Pomeroy—AIRPORT—City,
ing airport. **$240,000.** CAA will
finance.

Wash., Port Gamble—AIRPORT—
grading airport. **$295,000.** CAA will
finance.

Wash., Port Townsend—AIRPORT—
grading, lighting paving airport.
CAA will help finance.

Wash., Prosser—AIRPORT—City, gra
airport. **$40,000.** CAA will help finan

Wash., Pullman—AIRPORT—City,
ing airport. **$60,000.** CAA will help

Wash., Queets—AIRPORT—City, gra
airport. **$250,000.** CAA will help finan

Wash., Quinalt Lake—AIRPORT—
grading airport. **$330,000.** CAA will
finance.

Wash., Republic—AIRPORT—City,
ing airport. **$150,000.** CAA will help

Wash., Ritzville—AIRPORT—City,
ing, lighting paving airport. $290,000.
will help finance.

Wash., Rockport—AIRPORT—City,
ing airport. **$165,000.** CAA will help

Wash., Rosalia—AIRPORT—City, gra
airport. **$199,000.** CAA will help finance

★**Wash., Seattle**—AIRPORTS—City,
ing, paving, lighting airport, $2,680
grading, paving, lighting airport, $2,204
grading, paving, lighting airport. $520
CAA will help finance.

Wash., Seattle—FISH HATCHERY—
versity of Washington, E. 42 St. and 15
N.E., Zone 5, fish hatchery. **$100,000.** Fin
ing not provided.

Wash., Sekiu—AIRPORT—City, grad
lighting, paving airport. **$402,000.** CAA
help finance.

Wash., South Bend—AIRPORT—
lighting airport. **$25,000.** CAA will
finance.

Wash., Spokane—AIRPORT—City,
ing, paving, lighting airport. $150,000.
will help finance.

Wash., Sprague—AIRPORT—City, gra
airport. **$60,000.** CAA will help finance

Wash., Sunnyside—AIRPORT—City,
ing airport. **$117,000.** CAA will help

★**Wash., Tacoma**—AIRPORTS—City,
ing, paving, lighting airport, $565
grading airport, **$220,000.** CAA will
finance.

Wash., Toppenish—AIRPORT—City,
ing airport. **$148,000.** CAA will help

Wash., Union—AIRPORT—City, grad
airport. **$99,000.** CAA will help finance.

★**Wash., Vancouver** — AIRPORT —
grading, paving, lighting airport
564,000. CAA will help finance.

Wash., Walla Walla—AIRPORT—
grading, lighting airport. $200,000. CAA
help finance.

Wash., Warden—AIRPORT—City,
ing airport. **$47,000.** CAA will help

Wash., Wenatchee—AIRPORT—City,
ing, paving airport. **$140,000.** CAA
help finance.

Wash., Westport—AIRPORT—City,
ing, lighting airport. **$91,000.** CAA
help finance.

Wash., White Bluffs — AIRPORT —
grading airport. **$65,000.** CAA will
finance.

Wash., Wilbur—AIRPORT—City, grad
airport. **$80,000.** CAA will help finance.

Wash., Winslow-Bainbridge—AIRPORT
Cities, grading, airport. **$147,000.** CAA
help finance.

Wash., Winthrop—AIRPORT—City,
ing airport. **$36,000.** CAA will help

Wash., Winthrop-Twisp—AIRPORT—
ies, grading airport. **$75,000.** CAA
help finance.

Wash., Yakima—AIRPORT—City, grad
paving, lighting airport. **$103,000.** CAA
help finance.

W. Va., Amherstdale—AIRPORT—
grading, lighting airport. **$70,000.** CAA
help finance.

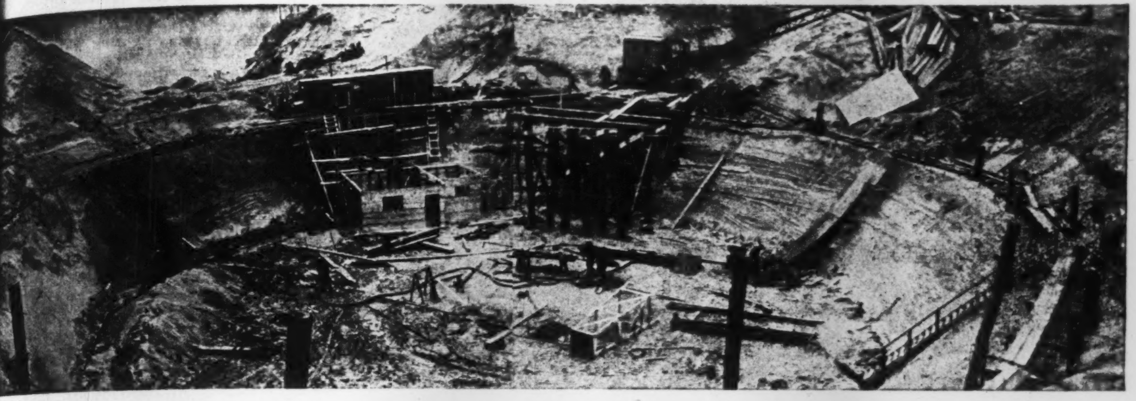
W. Va., Arbuckle—AIRPORT—City,
ing, lighting airport. **$64,000.** CAA
help finance.

★**W. Va., Beckley**—AIRPORT—City,
ing, lighting, paving airport. $2,130
CAA will help finance.

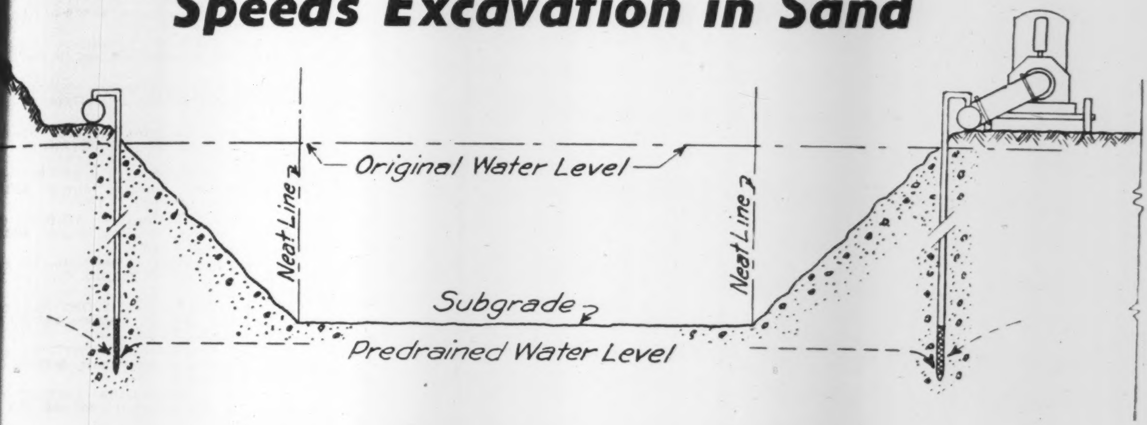
W. Va., Berkeley Springs—AIRPORT
City, grading, lighting airport. $57,000
will help finance.

W. Va., Berwind—AIRPORT—City,
ing, lighting airport. **$87,000.** CAA
help finance.

A Griffin Wellpoint Job!



Rapid Griffin Predraining Speeds Excavation in Sand



No sheeting needed on this job

This excavation for a municipal water supply was situated only a few yards from open harbor water. Sand was bulldozed across the dredged harbor to form a dike. The photo above shows the excavation 10 days after two Griffin Pumps started with Griffin Wellpoints at 4-foot intervals. Water level dropped 20 feet. Removal of water pressure allowed sand to repose naturally on a 1 to 1 slope; and excavation proceeded without delay. Dry YOUR next wet job for less—use GRIFFIN WELLPOINTS.

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W. Va., Bloomery—AIRPORT—City, gr
ing, lighting airport. $77,000. CAA
help finance.

★**W. Va., Bluefield** — AIRPORT — C
grading, paving, lighting airport $1,
000. CAA will help finance.

W. Va., Buckhannon—AIRPORT—C
grading, paving, lighting airport. $323,
CAA will help finance.

W. Va., Cameron—AIRPORT—City, gr
ing, lighting airport. $73,000. CAA
help finance.

W. Va., Cedar Grove—AIRPORT—C
grading, lighting airport. $77,000. C
will help finance.

★**W. Va., Charleston**—AIRPORT—C
grading, paving, lighting airport
140,000. CAA will help finance.

W. Va., Charles Town—AIRPORT—C
grading, lighting airport. $73,000. C
will help finance.

★**W. Va., Clarksburg**—AIRPORT—C
grading, paving, lighting airport. $7
000. CAA will help finance.

W. Va., Clendenin—AIRPORT—City, gr
ing, lighting airport. $57,000. CAA
help finance.

W. Va., Davis—AIRPORT—City, gradi
lighting airport. $77,000. CAA will h
finance.

W. Va., Durbin—AIRPORT—City, gr
ing, lighting airport. $92,000. CAA will h
finance.

W. Va., East Rainelle—AIRPORT—Ci
grading, lighting airport. $70,000. CAA
help finance.

W. Va., Elizabeth—AIRPORT—City, gr
ing, lighting airport. $77,000. CAA will h
finance.

★**W. Va., Elkins**—AIRPORT—City, gr
ing, paving airport. $580,000. CAA
help finance.

W. Va., Eskdale—AIRPORT—City, gr
ing, lighting airport. $68,000. CAA will h
finance.

W. Va., Falling Waters—AIRPORT—Ci
grading, lighting airport. $77,000. CAA
help finance.

W. Va., Fayetteville—AIRPORT—Ci
grading, lighting airport. $87,000. CAA
help finance.

★**W. Va., Filbert**—AIRPORT—City, gr
ing, paving, lighting airport. $533,
CAA will help finance.

W. Va., Follansbee—AIRPORT—Ci
grading, paving, lighting airport. $493,
CAA will help finance.

W. Va., Franklin—AIRPORT—City, gr
ing, paving airport. $97,000. CAA will he
finance.

W. Va., Glenville—AIRPORT—City, gr
ing, lighting airport. $68,000. CAA will he
finance.

W. Va., Grafton—AIRPORT—City, gr
ing, lighting, paving airport. $473,000. CA
will help finance.

W. Va., Grantsville—AIRPORT—Ci
grading, lighting airport. $82,000. CAA w
help finance.

W. Va., Hamlin—AIRPORT—City, gr
ing, lighting airport. $87,000. CAA will he
finance.

W. Va., Harrisville—AIRPORT—Ci
grading, lighting airport. $77,000. CAA w
help finance.

W. Va., Hinton—AIRPORT—City, gradin
lighting airport. $82,000. CAA will he
finance.

W. Va., Holden—AIRPORT—City, gradin
lighting airport. $498,000. CAA will he
finance.

★**W. Va., Huntington**—AIRPORT—Ci
grading, paving, lighting airport. $2,70
000. CAA will help finance.

W. Va., Hurricane—AIRPORT—Ci
grading, lighting airport. $27,000. CAA w
help finance.

W. Va., Kenova—AIRPORT—City, gra
ing, lighting airport. $78,000. CAA will he
finance.

W. Va., Keyser—AIRPORT—City, gra
ing, lighting airport. $78,000. CAA will he
finance.

W. Va., Kingwood—AIRPORT—City, gra
ing, lighting airport. $92,000. CAA will he
finance.

W. Va., Lewisburg—AIRPORT—City, gra
ing, lighting airport. $68,000. CAA will he
finance.

W. Va., Lumberport — AIRPORT — Ci
grading, lighting airport. $92,000. CAA w
help finance.

W. Va., Madison—AIRPORT—City, gra
ing, lighting airport. $112,000. CAA w
help finance.

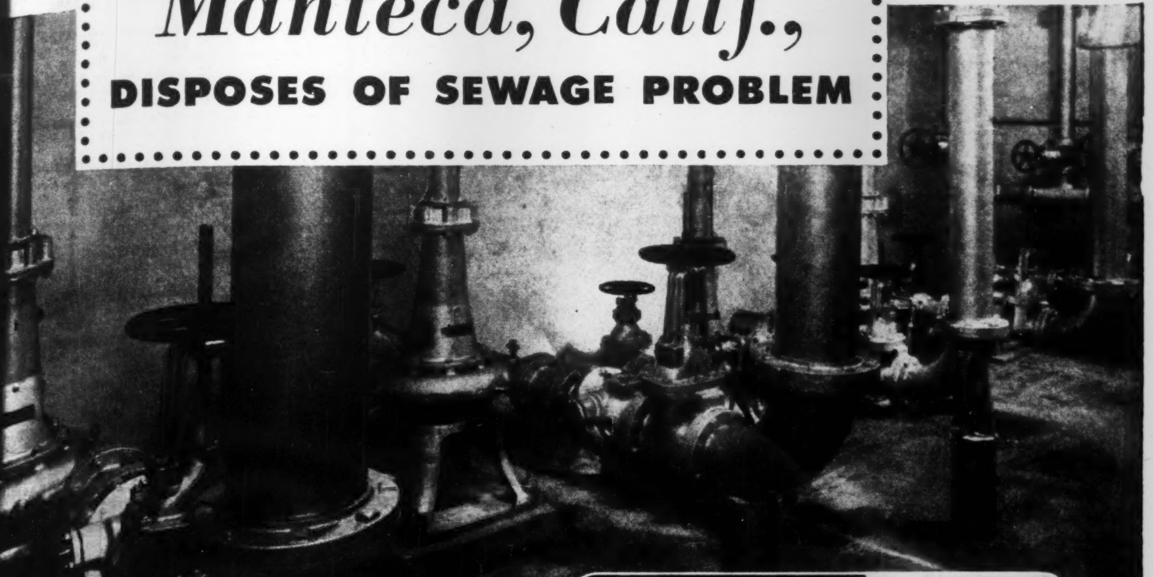
W. Va., Mannington — AIRPORT — Ci
grading, lighting airport. $107,000. CA
will help finance.

W. Va., Mill Creek — AIRPORT — Ci
grading, lighting airport. $87,000. CAA w
help finance.

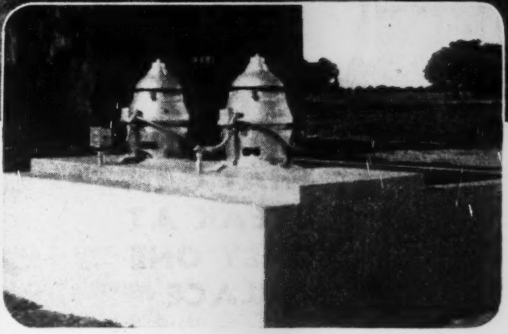
W. Va., Milton—AIRPORT—City, gradin
lighting airport. $77,000. CAA will he
finance.

Manteca, Calif.,

DISPOSES OF SEWAGE PROBLEM



Battery of Fairbanks-Morse dry-pit pumps at Manteca



Two Fairbanks-Morse vertical submerged pumps for recirculation

BACK in 1938 the City Council of Manteca, Calif., realized it faced an exceptional sewage disposal problem. An inadequate system coupled with enormous industrial waste volume presented many special problems. Surveys indicated this town of 2,000 needed a plant big enough for the average city of about 40,000.

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W. Va., Moorefield—AIRPORT—City, gr
ing, lighting airport. $35,000. CAA
help finance.

★**W. Va., Morgantown**—AIRPORT—
grading, paving, lighting airport
380,000. CAA will help finance.

W. Va., Moundsville — AIRPORT — C
grading, paving, lighting airport. $43
CAA will help finance.

W. Va., Mount Hope — AIRPORT — C
grading, lighting airport. $35,000. CAA
help finance.

W. Va., Mullens—AIRPORT—City, gr
ing, lighting airport. $97,000. CAA will
finance.

W. Va., New Cumberland — AIRPORT
City, grading, lighting airport. $107,
CAA will help finance.

W. Va., New Martinsville — AIRPORT
City, grading, lighting airport. $92,000. C
will help finance.

W. Va., Nitro—AIRPORT—City, gradi
paving, lighting airport. $493,000. C
will help finance.

W. Va., Omar—AIRPORT—City, gradi
lighting airport. $102,000. CAA will h
finance.

W. Va., Otter—AIRPORT—City, gradi
lighting airport. $87,000. CAA will h
finance.

W. Va., Parkersburg — AIRPORT — C
imprv. airport. $30,000. CAA will help
nance.

W. Va., Parsons—AIRPORT—City, gr
ing, lighting airport. $97,000. CAA will h
finance.

W. Va., Pennsboro—AIRPORT—Ci
grading, lighting airport. $97,000. CAA
help finance.

W. Va., Petersburg—AIRPORT—Ci
grading, lighting, paving airport. $373,
CAA will help finance.

W. Va., Philippi—AIRPORT—City, gr
ing, lighting airport. $112,000. CAA will h
finance.

W. Va., Pineville—AIRPORT—City, gr
ing, lighting airport. $97,000. CAA will h
finance.

W. Va., Point Pleasant—AIRPORT—Ci
grading, lighting airport. $473,000. CAA w
help finance.

W. Va., Powellton—AIRPORT—City, gr
ing, lighting airport. $112,000. CAA w
help finance.

W. Va., Princeton—AIRPORT—City, gr
ing, lighting airport. $46,000. CAA will he
finance.

W. Va., Red Jacket—AIRPORT—Ci
grading, lighting airport. $97,000. CAA w
help finance.

★**W. Va., Richwood**—AIRPORT—Ci
grading, paving, lighting airport. $62
000. CAA will help finance.

W. Va., Ripley—AIRPORT—City, gradin
lighting airport. $97,000. CAA will he
finance.

W. Va., St. Mary's—AIRPORT—Ci
grading, lighting airport. $77,000. CA
will help finance.

W. Va., Salem—AIRPORT—City, gradin
lighting airport. $92,000. CAA will he
finance.

W. Va., Shinnston—AIRPORT—City, gra
ing, lighting airport. $97,000. CAA w
help finance.

W. Va., Sistersville — AIRPORT — Ci
grading, lighting airport. $107,000. CA
will help finance.

★**W. Va., Spencer**—AIRPORT—City, gra
ing, paving, lighting airport. $523,0
CAA will help finance.

W. Va., Summersville—AIRPORT—Ci
grading, lighting airport. $107,000. CA
will help finance.

W. Va., Sutton—AIRPORT—City, gradin
paving, lighting airport. $325,000. CA
will help finance.

W. Va., Union—AIRPORT—City, gradin
lighting airport. $107,000. CAA will he
finance.

W. Va., War Eagle — AIRPORT — Cit
grading, paving, lighting airport. $283,0
CAA will help finance.

W. Va., Wayne—AIRPORT—City, gradin
lighting airport. $97,000. CAA will he
finance.

W. Va., Webster Springs—AIRPORT—Cit
grading, lighting airport. $92,000. CA
will help finance.

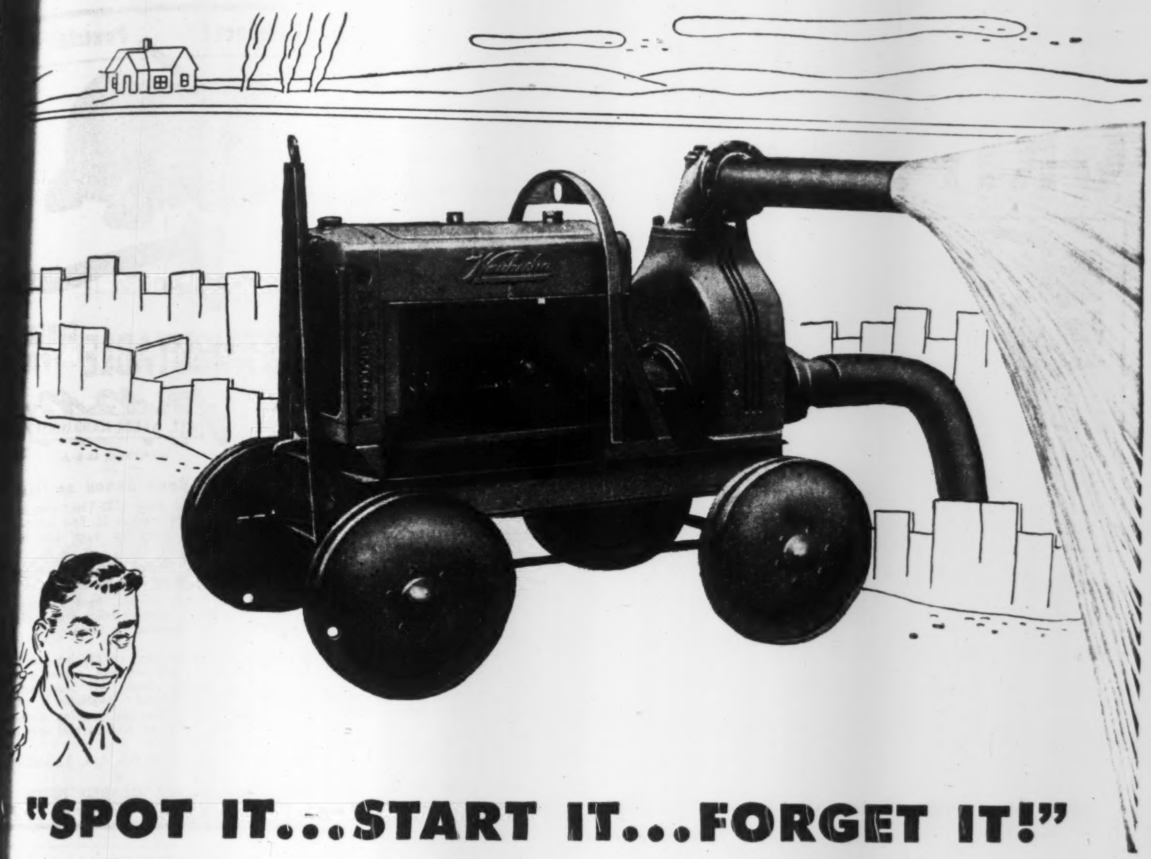
★**W. Va., Welch**—AIRPORT—City, grad
ing, paving, lighting airport. $573,0
CAA will help finance.

★**W. Va., Wellsburg**—AIRPORT—Cit
grading, paving, lighting airport. $47
000. CAA will help finance.

W. Va., Weston—AIRPORT—City, grad
ing, paving, lighting airport. $373,000. CA
will help finance.

W. Va., Wheeling—AIRPORT—City, grad
ing airport. $100,000. CAA will help finance

★**W. Va., White Sulphur Springs**—AIR
PORT—City, grading, paving, lightin
airport. $583,000. CAA will help finance.



"SPOT IT...START IT...FORGET IT!"

sir, that's all you need to do with a Rex Speed e Pump," says the owner of a large construc- company. "Just spot it on the job . . . start the r and forget your pumping problems. You'll hat these pumps are easy to transport and will ate dependably without care or trouble."

d you don't have any worries about priming -priming. That's all handled automatically by special Rex Recirculating Valve and the only stable "Air-Peeler" that literally peels air from impeller and rushes it out the discharge line. s means that a Rex Pump starts moving water in the fastest possible time.

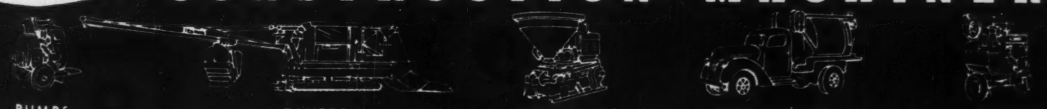
What's more, Rex Pumps are built for longer efficiency and service. The "Free Flow" design eliminates water "detours" . . . assures a straight-line flow in the shortest, most direct route to the impeller itself. That's why you pump more water, use less power, maintain pump efficiency longer.

When you specify *Rex, you save money!* If you need pumps now or plan on new ones in the future . . . see your Rex Distributor or write for Bulletin No. 443. Chain Belt Company, 1633 West Bruce Street, Milwaukee 4, Wisconsin.

DEALER IMPRINT

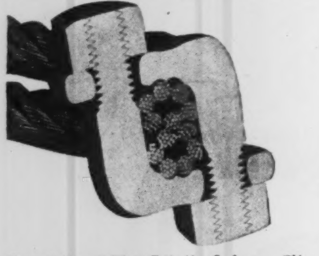
REX

CONSTRUCTION MACHINERY



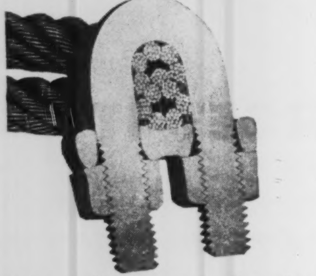
PREFORMED WIRE ROPE DESERVES TO BE HANDLED WITH CARE. SEE WHAT ACTUALLY HAPPENS IN THESE CROSS-SECTION VIEWS.

GRIP...or



Laughlin "Fist-Grip" Safety Clip holds rope firmly by friction — with hardly any flattening.

CRUSH?



Ordinary U-bolts crush wires, frequently ruining rope ends. (Notice distorted hemp center under "U".)

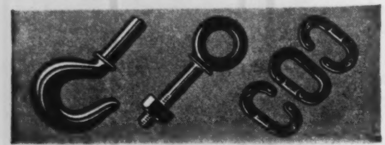
(Nuts tightened to same tension with torque-indicating wrench in both cases)

"Fist-Grip" Clips protect your rope. 25% fewer can be used, because improved bearing surfaces deliver full rope power. They save time, too, because they go on faster — with any type wrench — and can't be put on backwards. They are the only clips with drop-forged bolts. Order test samples from your distributor today.

Distributed through mill, mine and oil field supply houses. For a complete catalog on Laughlin's wire rope and chain hardware, write to Dept. 2, The Thomas Laughlin Co., Portland 6, Maine.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



POSTWAR PROJECTS (Cont'd.)

W. Va., Widen—AIRPORT—City, grading, lighting airport. **$107,000. CAA will help** finance.

★ **W. Va., Williamson**—AIRPORT—City, grading, paving, lighting airport. **$1,083,000.** CAA will help finance.

Wis., Adams—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Algoma—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Antigo—AIRPORT—City, grading, paving, lighting airport. **$304,000.** CAA will help finance.

★ **Wis., Appleton**—AIRPORT—City, grading, lighting, paving airport. **$730,000.** CAA will help finance.

★ **Wis., Ashland**—AIRPORT—City, grading, paving, lighting airport. **$730,000.** CAA will help finance.

Wis., Baraboo—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

Wis., Barron — AIRPORT — City, grading airport. **$25,000.** CAA will help finance.

Wis., Beaver Dam—AIRPORT—City, grading, paving, lighting airport. **$304,000.** CAA will help finance.

Wis., Bloomer—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Boscobel—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Brodhead—AIRPORT—City, grading, lighting airport. **$40,000.** CAA will help finance.

Wis., Burlington—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

Wis., Butler — AIRPORT — City, grading, paving, lighting airport. **$304,000.** CAA will help finance.

Wis., Cedarburg—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Chippewa Falls—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

Wis., Clintonville—AIRPORT—City, grading, paving, lighting airport. **$365,000.** CAA will help finance.

Wis., Columbus—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Crandon—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Darlington—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Darlington—PARK—City, C. V. Howery, clk., City Hall, park, incl. swimming pool, athletic field, tennis courts, picnic grounds, sheltering provisions, band shell. **$75,000.** Land rights not cleared, financing not provided.

Wis., Delavan—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

Wis., Dodgeville—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Eagle River—AIRPORT—City, grading, lighting airport. **$40,000.** CAA will help finance.

★ **Wis., Eau Claire**—AIRPORT—City grading, paving, lighting airport. **$515,000.** CAA will help finance.

Wis., Edgerton—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Evansville—AIRPORT—City, airport grading, etc. **$25,000.** CAA will help finance.

Wis., Fond du Lac—AIRPORT—City, grading, paving, lighting airport. **$365,000.** CAA will help finance.

Wis., Fort Atkinson—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

Wis., Grantsburg—AIRPORT—City, grading airport. **$25,000.** CAA will help finance..

Wis., Granville—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

★ **Wis., Green Bay**—AIRPORT—City, grading, paving, lighting airport. **$1,390,000.** CAA will help finance.

Wis., Hartford—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Horicon—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Hudson—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

Wis., Hurley—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Janesville—AIRPORTS—City, grading, lighting airport, **$64,000**; lighting, etc. airport, **$60,000.** CAA will help finance.

Wis., Jefferson—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Kaukauna—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Kewaunee—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., La Crosse—AIRPORT—City, lighting, imprv. airport, **$62,000.** CAA will help finance.

Wis., Ladysmith—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

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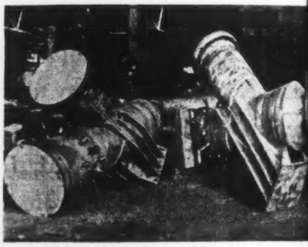
PIPING



Pressure piping, special wyes, tees, etc., fabricated from Class "A" steel or alloy steel.

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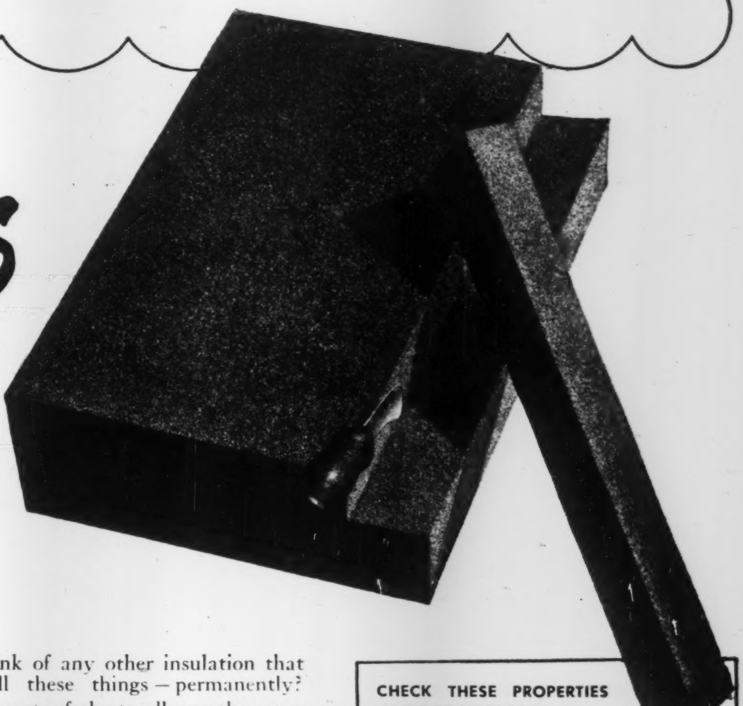
PC FOAMGLAS



You will find that PC Foamglas can be cut to fit around projections and openings right on the job, with ordinary tools. The big, strong, rigid slabs, conveniently packaged, can be handled and laid quickly and easily.

the long run, you will find this cel- lar glass material the most economi- insulation you can use. Why? use the insulating properties of PC glas are *permanent*.

hile the insulating efficiency of many ation materials deteriorates with PC Foamglas goes on year after without loss of its original insula- value. Being glass, it is impervious oisture, acid atmospheres, fumes, vapors. It is verminproof, fireproof. roofs and equipment, in floors and , PC Foamglas has maintained pre- mined temperature and humidity s. It prevents condensation. Can you think of any other insulation that does all these things—permanently?

In all sorts of plants, all over the country, PC Foamglas is in increasing demand among men who are facing insulating problems. Freedom from repairs and replacement alone is prime proof of its ability to keep insulation costs down.

When you are considering insulation, be sure to check other materials against PC Foamglas. For complete information, just fill in and mail the convenient coupon. We shall be glad to forward free copies of the booklets you select. Pittsburgh Corning Corporation, 632 Duquesne Way, Pittsburgh 22, Pa.

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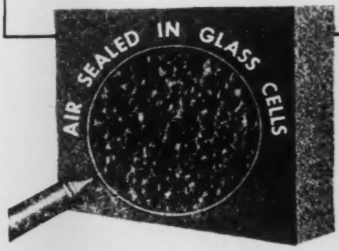
6. Easy installation
7. Rigid structure
8. Economical

FIRST COST IS LAST COST



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concrete floor, insulated with PC Foamglas, nts heat travel from the room below. A con- wearing floor will cover the PC Foamglas.

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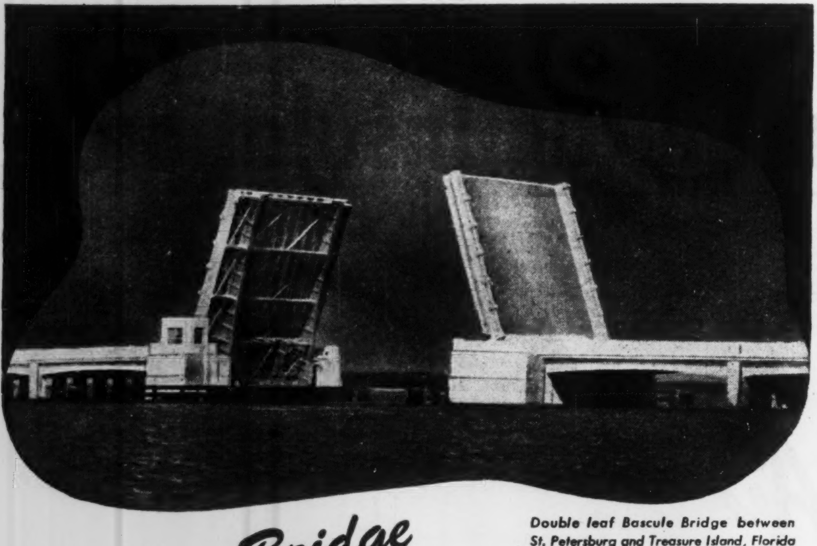

Double leaf Bascule Bridge between St. Petersburg and Treasure Island, Florida

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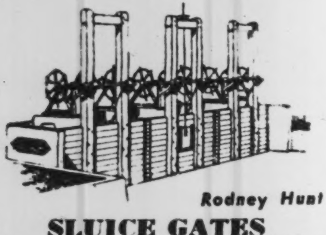

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POSTWAR PROJECTS (Cont'd.)

Wis., Lancaster—AIRPORT—City, gra airport. **$25,000.** CAA will help finance.

Wis., Land O'Lakes—AIRPORT— grading, lighting airport. **$40,000.** CAA help finance.

Wis., Laona—AIRPORT—City, gra airport. **$25,000.** CAA will help finance.

Wis., Lone Rock—AIRPORT—City, g ing, lighting airport. **$40,000.** CAA will finance.

Wis., Manitowac—AIRPORT—City, g ing, paving, lighting airport. **$73** CAA will help finance.

Wis., Marinette—AIRPORT—City, grad lighting airport. **$64,000.** CAA will finance.

Wis., Marshfield—AIRPORT—City, g ing, paving, lighting airport. **$365,000.** C will help finance.

Wis., Menominee—AIRPORT—City, g ing, lighting airport. **$64,000.** CAA help finance.

Wis., Merrill—AIRPORT—City, gradi lighting airport. **$64,000.** CAA will finance.

Wis., Middleton—AIRPORT—City, grad airport. **$25,000.** CAA will help financ

★ **Wis., Milwaukee** — AIRPORTS — C grading, paving, lighting airports, $ 000; grading airport $25,000; grading air $25,000. CAA will help finance.

Wis., Monroe—AIRPORT—City, grad airport. **$52,000.** CAA will help financ

Wis., Nekoosa—AIRPORT—City, grad airport. **$25,000.** CAA will help finance.

Wis., New London—AIRPORT—C grading airport. **$25,000.** CAA will h finance.

Wis., New Richmond—AIRPORT—C grading airport. **$25,000.** CAA will h finance.

Wis., Oconomowoc — AIRPORT —C grading airport. **$25,000.** CAA will h finance.

Wis., Oconto—AIRPORT—City, gradi lighting airport. **$64,000.** CAA will h finance.

Wis., Oconto Falls — AIRPORT — C grading airport. **$25,000.** CAA will h finance.

Wis., Osceola—AIRPORT—City, gradi lighting airport. **$40,000.** CAA will h finance.

★ **Wis., Oshkosh**—AIRPORT—City, gr ing, paving, airport. **$730,000.** C will help finance.

Wis., Park Falls—AIRPORT—City, gr ing, lighting airport. **$64,000.** CAA w help finance.

Wis., Phillips—AIRPORT—City, gradi airport. **$25,000.** CAA will help finance.

Wis., Platteville—AIRPORT—City, gr ing airport. **$25,000.** CAA will help financ

Wis., Plymouth—AIRPORT—City, gr ing, lighting airport. **$25,000.** CAA w help finance.

Wis., Port Washington—AIRPORT—Ci grading airport. **$25,000.** CAA will he finance.

Wis., Portage—AIRPORT—City, gradin lighting airport. **$64,000.** CAA will he finance.

Wis., Prairie Du Chien—AIRPORT—Cit grading, paving, lighting airport. $304,0 CAA will help finance.

★ **Wis., Racine**—AIRPORT—City, gradin paving, lighting airport. **$855,000.** CA will help finance.

★ **Wis., Rhinelander** — AIRPORT — Cit grading, paving, lighting airport. $73 000. CAA will help finance. CD 10/19—EN 11/2.

Wis., Rice Lake—AIRPORT—City, gra ing, paving, lighting airport. **$304,000.** CA will help finance.

Wis., Richland Center — AIRPORT — Cit grading airport. **$25,000.** CAA will hel finance.

Wis., Ripon—AIRPORT—City, grading ai port. **$64,000.** CAA will help finance.

Wis., River Falls—AIRPORT—City, grad ing airport. **$25,000.** CAA will help financ

Wis., Shawano—AIRPORT—City, gradin lighting airport. **$64,000.** CD 1/27/44—EN 2/10/44.

★ **Wis., Sheboygan**—AIRPORT—City, grad ing, paving, lighting airport. $955,0 CAA will help finance.

Wis., Siren — AIRPORT — City, grading paving, lighting airport. **$355,000.** CAA wi help finance.

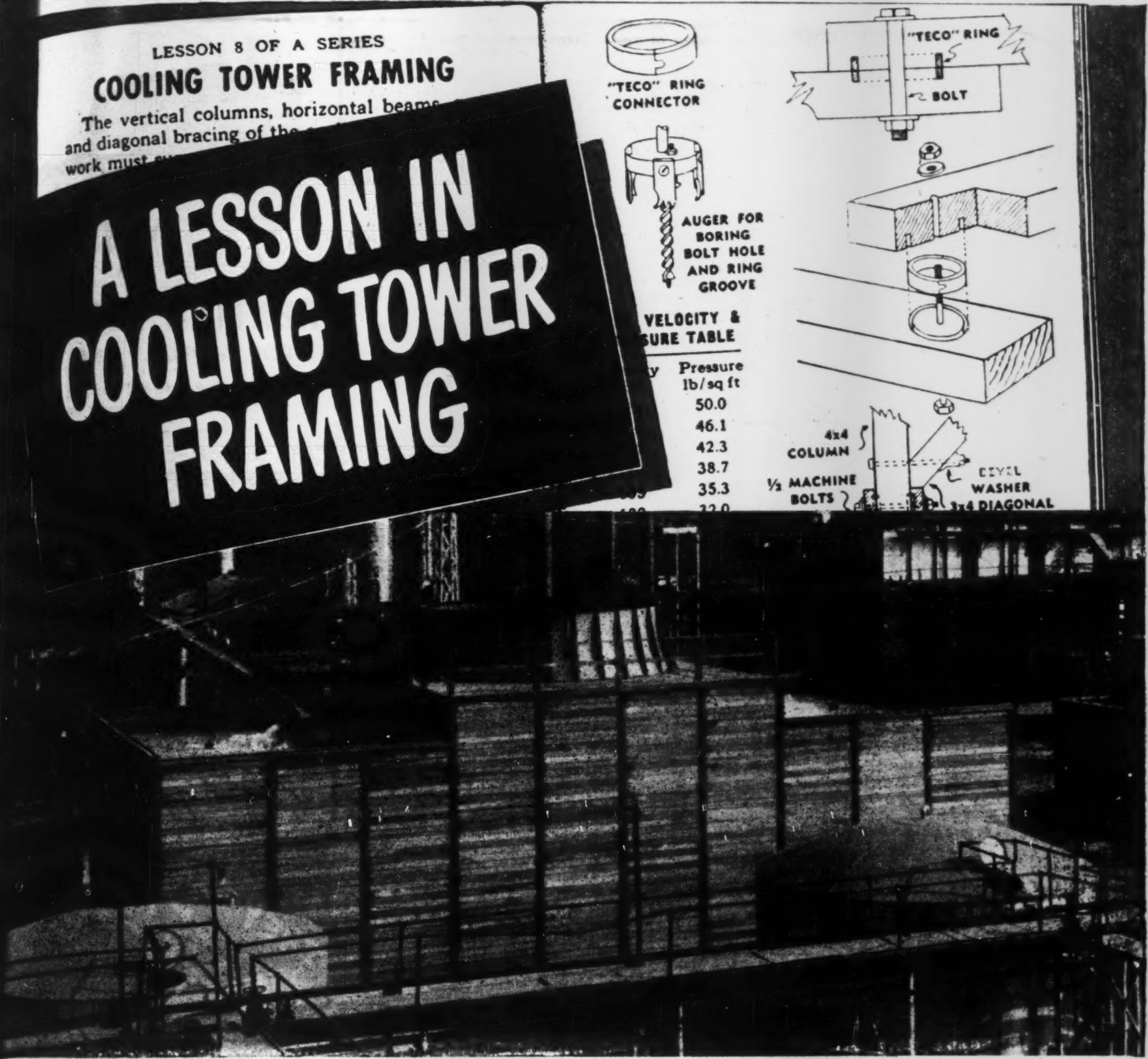
Wis., Sparta — AIRPORT — City, grading lighting airport. **$64,000.** CAA will hel finance.

Wis., Spooner—AIRPORT—City, grading lighting airport. **$64,000.** CAA will hel finance.

Wis., Stanley — AIRPORT — City, gradin airport. **$25,000.** CAA will help finance.

Wis., Stevens Point — AIRPORT — City grading, paving, lighting airport. $361,0 CAA will help finance.

Wis., Stoughton—AIRPORT—City, grad ing, lighting airport. **$64,000.** CAA will hel finance. CD 10/19—ENR 11/2.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and diagonal bracing of the
work must
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Water Cooling tower built for Louisville Refining Company by The Marley Company, Inc., Kansas City, Kansas and Stockton, California.

The Marley Company, one of the leading cooling tower manufacturers in the U. S., specifies and uses TECO connectors in its cooling tower framing. A section of the Marley cooling tower manual and a photograph of a Marley cooling tower are illustrated above.

Louisville Refining Company, Louisville, Kentucky, for whom this tower was built, states, "The inside framework is of much more rugged construction than we at first anticipated, especially the manner of reinforcing the joints with steel collars."

This water cooling tower is built of Redwood lumber. Framing is joined at all critical points with TECO connectors, standard equipment on Marley built cooling towers.

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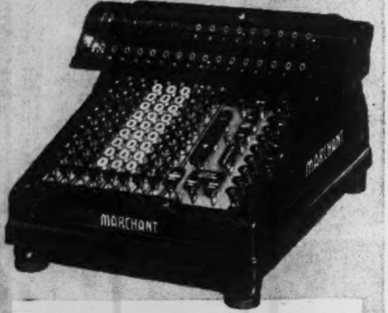
on Performance!



CHOOSE BY THIS CHECK-LIST:

COMPARE the time to perform any calculation of your figure work... from start of figure-entry to clearance of dials ready for next problem. Do not be mislead by "comparisons" that relate only to part of a calculation.

COMPARE the number of hand-to-key movements and amount of hand-travel. ☑

COMPARE extent of carry-over in answer dials, and accuracy of decimal point-off of entered amounts and answer. ☑

COMPARE provisions for re-check of entries after answer is complete ... a safety factor assuring correct calculations, always. ☑

COMPARE means for detection and correction of improperly set figures, during or after their entry. ☑

COMPARE simplicity and all-round ease of operation. ☑

COMPARE cost of upkeep, promptness and quality of repair service. ☑

And make these comparisons on *latest* models ... it is never to your best interest to compare an *old* model of one make with a *new* model of some other.

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POSTWAR PROJECTS (Cont'd.)

Wis., Sturgeon Bay — AIRPORT — City, grading, paving, lighting airport. **$304,000.** CAA will help finance.

★**Wis., Superior**—AIRPORT—City, grading, paving, lighting airport. **$955,000.** CAA will help finance.

Wis., Tomah—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

Wis., Viroqua—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

Wis., Watertown—AIRPORT—City, grading, paving, lighting airport. **$304,000.** CAA will help finance.

Wis., Waukesha—AIRPORT—City, grading, paving, lighting airport. **$304,000.** CAA will help finance.

Wis., Waupaca—AIRPORT—City, grading airport. **$25,000.** CAA will help finance.

Wis., Waupun—AIRPORT—City, grading, lighting airport. **$64,000.** CAA will help finance.

★**Wis., Wausau**—AIRPORT—City, grading, paving, lighting airport. **$730,000.** CAA will help finance.

Wis., West Bend—AIRPORT—City, grading, lighting airport. **$304,000.** CAA will help finance.

Wis., White Water—AIRPORT—City, grading, paving, lighting airport. **$25,000.** CAA will help finance.

Wis., Wisconsin Rapids—AIRPORT—City, grading, paving, lighting airport. **$365,000.** CAA will help finance.

Wyo., Afton—AIRPORT—City, grading airport. **$31,000.** CAA will help finance.

Wyo., Arminto—AIRPORT—City, grading airport. **$87,000.** CAA will help finance.

Wyo., Basin—AIRPORT—City, grading airport. **$65,500.** CAA will help finance.

Wyo., Cody—AIRPORT—City, grading, paving, lighting airport. **$325,000.** CAA will help finance.

Wyo., Cokeville—AIRPORT—City, grading airport. **$71,500.** CAA will help finance.

Wyo., Cowley—AIRPORT—City, grading airport. **$46,000.** CAA will help finance.

Wyo., Dubois—AIRPORT—City, grading, lighting airport. **$82,000.** CAA will help finance.

Wyo., Evanston—AIRPORT—City, grading, paving, lighting airport. **$335,000.** CAA will help finance.

Wyo., Gillette—AIRPORT—City, grading, lighting airport. **$97,000.** CAA will help finance.

Wyo., Green River—AIRPORT—City, grading airport. **$50,500.** CAA will help finance.

Wyo., Greybull—AIRPORT—City, grading, lighting airport. **$101,000.** CAA will help finance.

Wyo., Hanna—AIRPORT—City, grading airport. **$66,000.** CAA will help finance.

Wyo., Jackson—AIRPORT—City, grading, lighting airport. **$108,000.** CAA will help finance.

Wyo., Kemmerer—AIRPORT—City, grading airport. **$61,000.** CAA will help finance.

Wyo., Lander—AIRPORT—City, grading, lighting airport. **$83,000.** CAA will help finance.

Wyo., Laramie—AIRPORT—City, grading, paving, airport. **$210,000.** CAA will help finance.

Wyo., Lovell—AIRPORT—City, grading airport. **$42,000.** CAA will help finance.

Wyo., Lusk—AIRPORT—City, grading airport. **$47,000.** CAA will help finance.

Wyo., Medicine Bow—AIRPORT—City, grading airport. **$33,000.** CAA will help finance.

Wyo., Moran — AIRPORT — City, grading airport. **$26,000.** CAA will help finance.

Wyo., Newcastle—AIRPORT—City, grading, lighting airport. **$97,000.** CAA will help finance.

Wyo., Powell—AIRPORT—City, grading airport. **$36,000.** CAA will help finance.

Wyo., Rawlins—AIRPORT—City, grading, lighting airport. **$155,000.** CAA will help finance.

Wyo., Riverton—AIRPORT—City, grading airport. **$41,000.** CAA will help finance.

Wyo., Rock Springs—AIRPORT—City, grading, paving airport. **$132,000.** CAA will help finance.

Wyo., Sundance—AIRPORT—City, grading airport. **$65,500.** CAA will help finance.

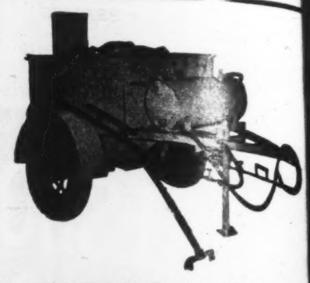
Wyo., Thermopolis — AIRPORT — City, grading, lighting airport. **$118,000.** CAA will help finance.

Wyo., Torrington—AIRPORT—City, grading, lighting airport. **$108,000.** CAA will help finance.

Wyo., Worland—AIRPORT—City, grading, lighting airport. **$97,000.** CAA will help finance.

Wyo., Yellowstone National Park—AIRPORT—City, grading, paving, lighting airport, **$45,000.** CAA will help finance.

†**Alaska, Matanuska** — AIRPORT — Matanuska Farm Colony, Matanuska, airport. **$300,000.** CAA. Financing not provided.



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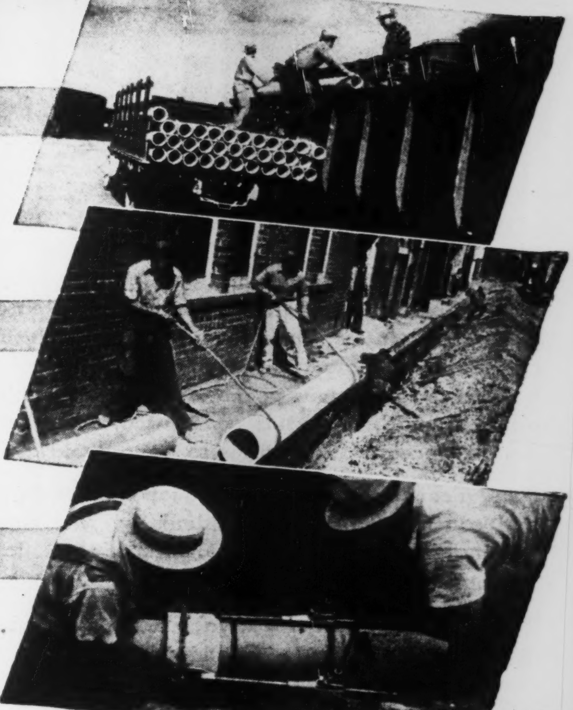

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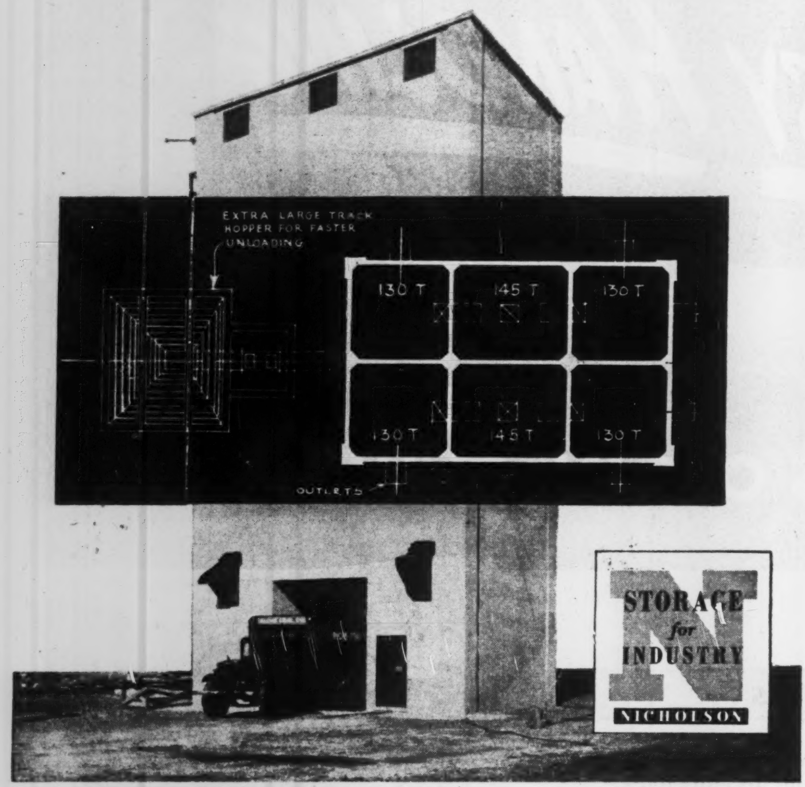

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POSTWAR PROJECTS (Cont'd.)

Sask., Melfort—AIRFIELD—Municipa commercial airfield. **$100,000.**

PLANS UNDER WAY

Calif., Glendale—PARK DEVELOPME —City, City Hall, Verdugo Park developme **$258,000.** J. C. Alberts, City Hall, city en

Calif., Stockton — GRANDSTAND, etc. San Joaquin Co., Court House, grandsta **$100,000;** machine shop, **$50,000.** Financ not provided. J. B. Manthey, Court Hou engr.

Ia., Des Moines—SWIMMING POOL—C A. Johnson, clk., City Hall, plans by Broo & Borg, Hubbell Bldg., swimming po **$100,000.** CD 4/12—ENR 4/20.

Mich., Detroit—AIRPORT BLDGS.—D P. Wks., City Hall, to city airport termi bldgs. addns., alterations. **$400,000.** G. Thompson, City Hall, city engr. CD 2/ ENR 3/8.

Minn., Elk River—DISTRIBUTION SY TEM—Village, H. A. Briggs, clk., City Ha plans under way dist. sys. for electric li and power plant. Over **$40,000.** Toltz, Ki & Day, 1509 Pioneer Bldg., St. Paul, consu engrs.

★**Mo., St. Louis**—AIRPORT GRADIN etc.—City, M. M. Kinsey, pres. Bd. Pu Serv., 304 City Hall, 12 and Market St Zone 1, plans under way grading, draina work at Lambert-St. Louis Airport, at Ro ertson, St. Louis Co. **$1,400,000.** Horner Shifrin, Shell Bldg., 1221 Locust Sts., Zone consult. engrs.

New York—DAMS—Dpt. P. Wks., Sta Office Bldg., Albany, Zone 1, plans und way 21 dams, statewide, CON-41B, for Di Fish & Game, Conservation Dpt. **$35,0** Financing not provided.

New York—DIKES, etc.—Dpt. P. Wk State Office Bldg., Albany, Zone 1, pla under way dikes, dams and water contr in Oak Orchard Creek, Albion Co., CON-4 for Div. Fish & Game, Conservation Dp **$46,000.** Financing not provided.

New York—REARING STATION—Dpt. Wks., State Office Bldg., Albany, Zone plans 40% completed Muskalonge Rearin Station, at Chautauqua Lake, Chautauqu Co., CON 37, for Div. Fish & Game, Con servation Dpt. **$80,000.** Financing not pro vided.

N. Y., Bear Mountain—ROLLER SKATING RINK—Dpt. P. Wks., State Office Bldg. Albany, Zone 1, plans completed by A. O Angilly, 1 Madison Ave., New York, Zone 10 roller skating rink, at Bear Mountain State Park, CON-76, for Palisades State Park Comn., Conservation Dpt. **$195,000.** Financing not provided. CD 3/16/44—ENR 4/6/44

★**O., Cincinnati**—SPORTS ARENA—Cincinnati Arena, Inc., Union Central Bldg. preliminary plans by F. W. Garber, Union Central Bldg., sports arena, **$1,000,000.**

★**Okla., Blackwell**—AIRPORT—City, City Hall, plans 30% completed airport on 22 acre site. **$800,000.** Land rights not cleared legal obstacles to be overcome. Financing provided. C. C. Pate, 2212 E. 20 St., Tulsa consult. engr. E. A. Jones, city engr. CD 1/11—ENR 1/25.

Okla., Blackwell—SWIMMING POOL, etc —City, City Hall, plans 70% completed swimming pool, playgrounds, **$125,000;** plans 50% completed fair grounds exten., **$100,00** Land rights not cleared, legal obstacles t be overcome. Financing provided. Toler & Willis, Ada, consult. engrs. E. A. Jones city engr.

★**Oregon**—POWER LINE, etc.—Coos Electric Cooperative, Coquille, plans under way 275 mi. power line and small hydroelectric plant, Coos and Curry Counties **$970,000.** Financing not provided. D. A. Lowe Lowe-Stoddard Co., 816 W. 5 St., Los Angeles, Calif., consult. engr.

R. I., Cranston — AIRFIELD — Daw Ma Air Associates, John S. Dawbar, 143 Academy Ave., and W. A. MacPhee, 90 Miller Ave. Wickford, plans under way airfield incl hangar and office. To exceed **$50,00** Private plans.

★**Alberta** — RAILWAY — Province of Alberta, Edmonton, railway from Highwood southeast to Calgary, **$1,500,000.** Dpt P. Wks., Edmonton, engr

★**N. B., Saint John**—AIRPORT—Municipality, municipal airport, purchased 2,000 acres at Clover Valley off Loch Lomond Rd. 9 mi. from here, incl. three 7,000 ft. runways. **$5,000,000.** Dpt. Transport, Ottawa, Ont., engr. CD 3/16.

★**Northwest Territory**—POWER DEVELOPMENT—Dominion Govt., Ottawa, Ont. survey completed power development o Liard and Pell Rivers, Fort Liard, over **$300,000;** on Snowdrift River, south of Great Slave Lake, Snowdrift, over **$300,000;** Hay River, over **$250,000;** on Great Bear Rive where it cuts through Franklin Mountains developed for mining purposes, Pond Inlet **$500,000.** Dpt. Mines & Resources, Ottawa Ont., engr.

READY FOR BIDS

Ill., Chicago—TUNNEL CLOSURE—City Dpt. P. Wks., City Hall, plans completed North La Salle St. tunnel closure, concrete slab roof. **$35,000.** Financing provided W. W. DeBerard, City Hall, city engr. S Michuda, City Hall, engr. of bridges

CONSTRUCTION REPORTS

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager *SCOTT McLEOD, Statistics* *J. A. MAHONEY, Reports*

(Daily service also available—Write for details)

WATER SUPPLY

ROPOSED WORK

N. J., Elizabeth — Elizabethtown Water , 22 W. Jersey St., concrete reservoir addn. Townley Sect. of Union. $25,000. F. Hud- n, 18 W. Jersey St., engr.

†N. H., Portsmouth—Yards & Docks, Navy pt., 18 St. and Constitution Ave. N. W., ash. 25, D. C., water supply development d distr. sys. modification, Navy Yard. 0,000.

†N. Y., Lake Seneca—Yards & Docks, vy Dpt., 18 St. and Constitution Ave. W., Wash. 25, D. C., emergency intake water pumping, Naval Training Station. 5,000.

†Pa., Phila.—Yards & Docks, Navy Dpt., St. and Constitution Ave. N.W., Wash. D. C., exten. water distr. sys., Naval Air aterial Center, $70,000.

†R. I., Melville—Yards & Docks, Navy pt., 18 St. and Constitution Ave. N.W., ash. 25, D. C., imprv. water supply sys., cinerator and drainage, Naval Fuel Depot, 5,000.

R. I., Providence—State and Providence antations, Div. Forests & Parks, State ouse, Providence, plans water supply line Haynes Park, West Barrington and East ovidence, to exceed $15,000; plans com- eted, pump sta., water mains, pump equip., all sys., Goddard Park, Warwick, $16,000.

Tex., Corpus Christi—City, A. C. McCau- an, mayor, plans completed filter plant ten. at Calallen. $350,000. Myers & oyes, Nixon Bldg., engrs.

†Tex., Kelly Field—U. S. Eng., Fort Sam ouston, addnl. c.i. waterlines, Ser. No. W- -154-45-107. Over $15,000.

Tex., Mission—City, L. Duncan, mayor, ty Hall, preparing plans, bids soon, WW prvs., incl. 500,000 gal. elevated water nk, enlarging storage reservoir, increasing mp. capacity, filtration plant enlargement, ten. distr. sys. $170,000 bonds voted. H. Ewing, Mission, engr. CD 3/6—ENR 3/8.

Ont., Kirkland Lake—Teck Twp., install- g watermains in Government Rd. East, ederal Townsite, Dixon and Furlong Sts. 00,000. Gore & Storrie, 1130 Bay St., To- nto, engrs.

Que., Ville St. Joseph—Municipality, 1,000 watermains. $15,000. O. Bessette, rummondville, engr.

IDS ASKED

Bids Asked April 10

Ia., Council Bluffs—Municipal Water Bd., Jensen, supt., Council Bluffs, intake reens and preliminary basin equip. Burn McDonnell, 107 W. Linwood Blvd., Kansas ty, Mo., engrs.

Mass., Braintree—Town, Water Dpt., fur- shing, installing, 11,825 lin. ft. 12 in. c.i. ater pipe. Over $15,000. Weston & Samp- n, 14 Beacon St., Boston, engrs. CD 8/31 ENR 9/7.

Pa., Bethlehem—City, 53 E. Broad St., L. Nagle, clk. water supply line with ppurtenances from E. Third St., etc. R. L. ox, 37 E. Broad St., city engr.; adv. ENR 5.

Bids Asked April 11

N. Y., Farmingdale—Dpt. Educ., Educa- on Bldg., Albany, Zone 1, pump house, mp and addnl. water supply. $15,000.

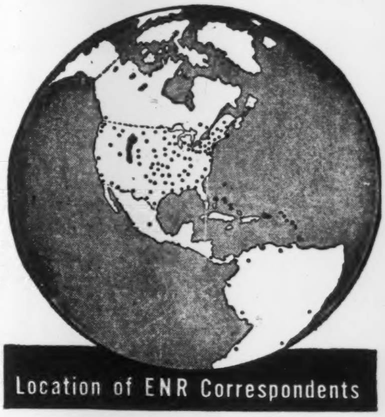
Wis., Eau Claire—City, water supply prvs., 13,510 ft. 24 and 30 in. c.i. supply ne, 1 story, bsmnt., 65 x 85 ft. pump. sta., mp. equip., electrical work. Plans de- sit $25. Greeley & Hansen, 6 N. Michigan ve., Chicago, Ill., engrs. CD 9/27—ENR /5.

Bids Asked April 12

†Tex., Temple — City Comptroller, City all, Contr. 1, water facilities, Tex. 41-708. 44,000. **FWA.** Plans deposit $25. J. Mont- mery, Nolle Annex, Austin, engr. CD 3/15 ENR 3/22.

Bids Asked May 15

N. C., Asheboro—Town, O. L. Presnell, ayor, Town Hall, WW imprvs., new raw ater supply, incl. gravity type masonry m, pump. sta., and 1¼ billion impounding servoir, covering 250 acres, furnishing, lay- g 10,500 ft. 16 in. raw water force main ith necessary valves and specials, 1 centri- gal motor-driven pump. unit, constructing y. bridge over 1 arm of lake, building cessary connecting road links and erecting wer line and telephone circuit from Lake 3, new pump. sta. Plans deposit $15 from own Clerk. W. M. Piatt, Durham, engr.



Location of ENR Correspondents

Symbols and Abbreviations Include:

- † Federal Government
- ★ Project of $500,000 or over
- CD Engineering News-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public other buildings, $150,000

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads):
BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Bids Asked April 17

Ia., Council Bluffs—Municipal Water Bd., F. Jensen, supt., Council Bluffs, low surface pump, valves and sluice gates. Burns & McDonnell, 107 W. Linwood Blvd., Kansas City, Mo., engrs.

LOW BIDDERS

Calif., San Diego—City, City Hall, Mar. 27, approx. 3,820 lin. ft. 16 in. Cl. 150 cement lined c.i. watermain, 19 St., from B. G. Carroll, 2260 Main St., **$25,989;** 4,800 lin. ft. 16 in. Cl. 160 cement lined c.i. watermain B St., from L. B. Butterfield, 2035 Main St., **$31,920.**

N. Y., Port Washington—Bd. Water Comrs., Port Washington, Mar. 20, well, appurtenances, from Layne-New York Co., 92 Liberty St., New York, Zone 6. Est. **$20,000.** CD 3/13—ENR 3/15.

N. J., Lakewood—Lakewood Water Co., 257 2 St., 1 m.g. 40 ft. diam., welded or riveted steel standpipe, 100 ft. high, concrete fdn., from Chicago Bridge & Iron Co., 1700 Walnut St., Phila., Pa., **$45,000.**

Tex., McKinney—City, City Hall, water supply well, from Layne-Texas Co., Ltd., 3903 Main St., Dallas, **$38,717.**

CONTRACTS AWARDED

†Ind., East Chicago—Waterworks Trustees, J. F. Fife, secy., City Hall, 1 story, 25x70 ft., brick, stone, rein.-con. water filtration plant imprvs., and 2 new filter cells, Ind. 12-142-N, to R. C. Clark, 4005 Grand St., Indiana Harbor, **$64,536. FWA.** CD 2/13 —ENR 2/15.

N. J., Rockaway—Rockaway Boro., Municipal Bldg., concrete reservoir, to J. W. Rogers Co., Main St., Sucasunna, **$19,216.** CD 3/2.

Utah, Ogden—Ogden City, E. M. Tillotson, city recdr., City and County Bldg., 2 deep wells at Hinckley Airport, to W. Stoddard, Hooper, **$19,980** each. Bids 3/19. CD 2/23 —ENR 3/1.

Wis., Wisconsin Rapids—Waterworks & Lighting Comn., F. L. Steib, mgr., Wisconsin Rapids, furnishing pipe for water supply line, to Johns-Manville Co., 757 W. Broadway, Milwaukee, Zone 2, **$35,681.** Bids and awarded 3/23. Foth, Voyd & Porath, 469 Walnut St., Green Bay, engrs.

Ont., Leaside—Town, R. V. Talbot, clk., 211 Bessborough Dr., installing watermains in various streets, to Ruscica Brothers, 25 Industrial St., about **$30,000.** Bids 3/12. Gore & Storrie, 1130 Bay St., Toronto, engr. CD 2/26 —ENR 3/1.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Laguna Beach—City, City Hall, constructing Temple Hills vitr. clay sanitary sewer, $51,870. J. R. Lester Doyle, City Hall, city engr.

Calif., Los Angeles—Los Angeles Co., Hall of Records, 68,078 ft., 6- to 15-in., vitr. clay sanitary sewer, etc. in Gibson Ave., etc., CI 1095. $132,180. A. Jones, Hall of Records, co. engr.

†Calif., San Diego—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. garbage and trash disposal facilities, Naval Repair Base. $65,000.

Calif., San Mateo—Lomita Park & Capuchino Sanitary Dists., c/o E. Wilson, 307 B St., sewer project in new joint sanitary district, $65,000. J. Waters, 172 University Ave., Palo Alta, engr.

†Calif. Shoemaker—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., ten-ton incinerator, Construction Battalion Replacement Depot, Camp Parks. $150,000.

†Calif., Shoemaker—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., ten-ton incinerator, Naval Training and Distribution Center. $40,000.

†Ind., Crane—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., incinerator, Naval Ammunition Depot, $60,000.

Ind., Indiana Harbor—Inland Steel Co., 38 S. Dearborn St., Chicago, Ill., sewage treatment plant. $60,000. Greeley & Hansen, 6 N. Michigan Ave., Chicago, Ill., engrs.

†Md., Port Deposit—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., sewage treatment plant addn., Naval Training Station. $85,000.

†Mass., Boston — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., replacing wooden drains, at Navy Yard. $50,000.

Mich., L'Anse—Village, completing plans specifications for sewage treatment plant. $85,000. McMahon Engrg. Co., Menasha, engrs.

Neb., Sidney—City, R. E. Roche, chn., enlarging sewage disposal plant, $60,000. R. Fulton, 2327 S. 19 St., Lincoln, engr. City petitioned FWA to reconsider application for grant. CD 1/11—ENR 1/13.

Nev., Pioche—City, City Hall, lateral sewerage sys. $91,000. Applied for FWA funds.

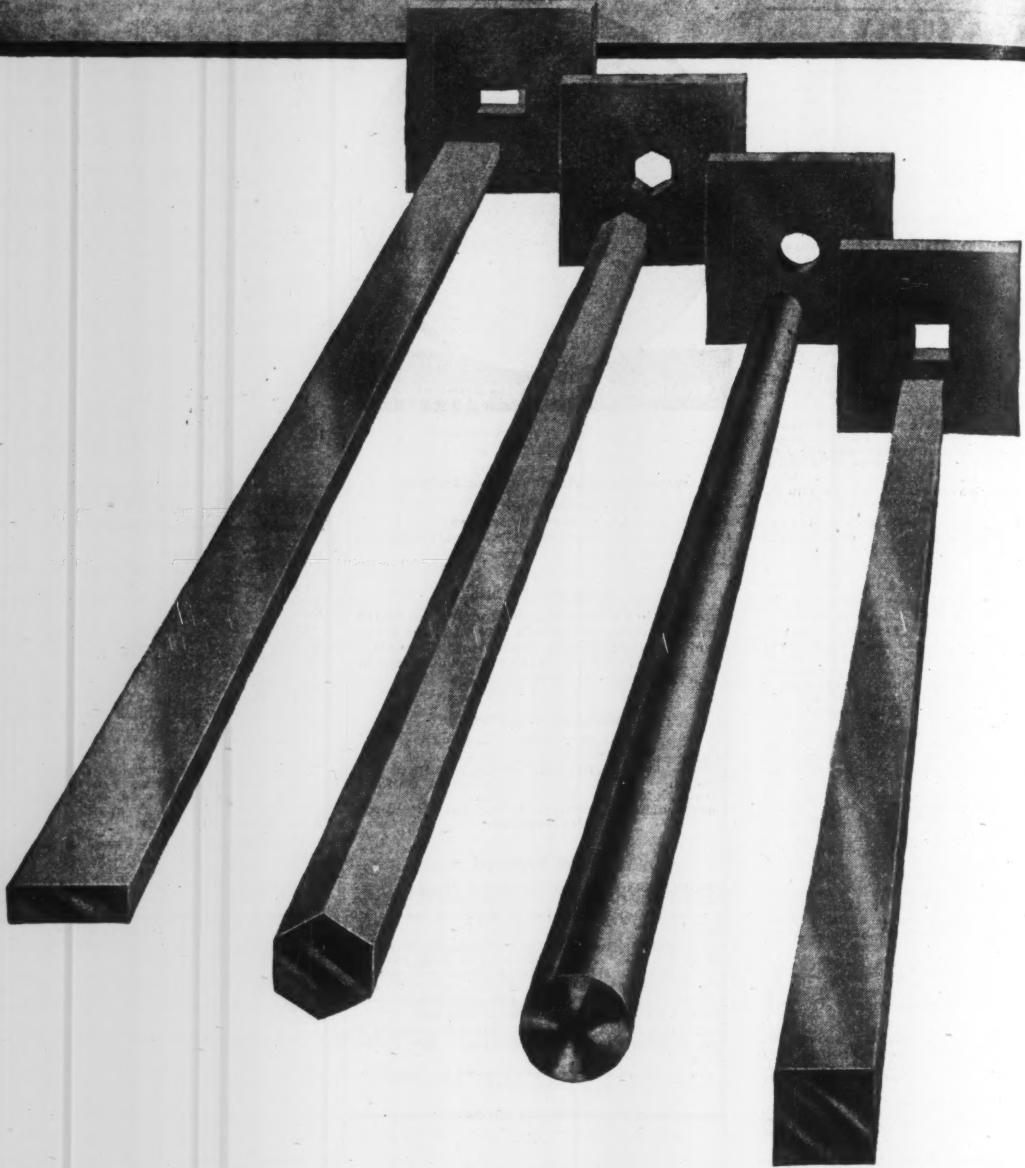
†N. Y., Lake Seneca—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., incinerator addn., at Naval Training Station. $125,000.

Ore., Klamath Falls—City, City Hall, exten. sewerage sys. $135,000. FWA funds sought. E. A. Thomas, City Hall, city engr.

Ore., Salem—City, City Hall, 14 in. sanitary sewerage sys., 18 in. storm drain sys. $69,100. J. H. Davis, City Hall, city engr.

COLD FINISHED STEEL

FROM COLD FINISHED HEADQUARTERS



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J&L STEEL

ERS, WASTE DISPOSAL (Proposed ork, Cont'd.)

re., Tillamook — AIR STATION PRVS. — Yards & Docks, Navy Dpt., 18 and Constitution Ave. N.W., Wash. 25, ., sewage treatment facilities, Naval Air ion. $60,000.

a., Fort Mifflin—Yards & Docks, Navy , 18 St. and Constitution Ave. N.W., h. 25, D. C., sanitary sewerage sys., al Ammunition Depot, $100,000.

., Mission—City, L. Duncan, mayor, Hall, preparing plans, bids soon, sani- sewer imprvs., incl. enlarging sewage osal plant, increasing sludge digesting acity, enlarging, sprinkler filter area and n. distr. sys. $80,000 bonds voted. H. H. ng, Mission, engr. CD 3/6—ENR 3/8.

ex., Weslaco—City, V C. Thompson, secy., Hall, rejected bids Mar. 20, sanitary er imprvs., incl. 6 and 8 in. vitr. tile col- tion lines, manholes and 2 sewage lift np. plants, sludge collection equip. Valco, , M & M Bldg., Houston, engrs. CD 3/5 NR 3/8.

Utah, Clearfield—Yards & Docks, Navy ., 18 St. and Constitution Ave. N.W., sh. 25, D. C., addnl. incinerator, Naval ply Depot, $64,000.

†Va., Norfolk—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., sh. 25, D. C., storm and sanitary sewer- sys., rehabilitation, $750,000; imprv. inage sys. for Bldgs. 163, 171, 202 and . at Navy Yard. $60,000.

Wash., Prosser—City, City Hall, sewage posal plant, $75,000. Seeking FWA funds. D. Hall, Larson Bldg., Yakima, engr. CD 5—ENR 3/31.

†Wash., Puget Sound—Yards & Docks, Navy t., 18 St. and Constitution Ave. N.W., sh. 25, D. C., refuse burner, accessories, vy Yard. $40,000.

†Wash., Seattle — Yards & Docks, Navy t., 18 St. and Constitution Ave. N.W., ash. 35, D. C., sewerage sys. addns., Naval tion. $115,000.

DS ASKED

Bids Asked April 9

Mass., Mansfield—Town, Town Mgr., Town all, 3,350 ft. 8 in. watermains, constructing sludge beds, at sewer plant.

Bids Asked April 18

Calif., Los Angeles—Bd. P. Wks., City all, 5,576 lin. ft., vitr. clay sewer, house nnections, repaving, etc. $39,263. L. Al- rich, City Hall, city engr.

Bids Asked April 23

Tex., Lubbock—City, at City Manager's ffice, sanitary sewer lines, imprvs. $25,000. lans deposit $15. A. L. King, city engr.

Bids Asked April 25

†Va., Portsmouth—City, at office A. S. wens, mgr., City Hall, 24,900 lin. ft. 24, and 48 in. force main addns. sanitary werage sys., Divs. DA, SB, DC, Va. 44-141. WA. Plans deposit $25. F. J. Bergeron, ty engr. Greeley & Hansen, 6 N. Michigan ve., Chicago, Ill., engrs.; adv. ENR 4/5.

Bids Asked April 30

N. J., Fair Lawn—Mayor and Council of oro of Fair Lawn, sewerage sys., appur- nances. Plans deposit $25. T. F. Bowe, 0 William St., New York 7, N. Y., consult. ngr.; adv. ENR 4/5. CD 2/8—ENR 2/15.

Bids Asked May 1

Fla., Hollywood—City, 75 ton steel, con- rete, open type incinerator, with 80 ft. igh radial brick chimney. $40,000.

OW BIDDERS

†Md., Hyattsville—Washington Suburban anitary Comn., Hamilton St., Mar. 23, 150 on refuse incinerator, Contr. 180, from . H. Martell Co., 920 17 St. N.W., Wash., . C., $248,800. CD 2/27—ENR 3/1.

Tex., Dallas—City, E. G.forth, secy., in- talling sewage pumps and motors, wiring nd building modification at Cadiz St. sewage ump. station, from J. G. Bartholomew, onstruction Bldg., $2[illegible],500.

Tex., Houston—City, M. H. Westerman, ecy., Mar. 21, sanitary sewers, Kenmore nd Lawndale Sts., from Griggs Rd. to 75 St., rom Knudson Const. Co., Commerce Bldg., 27,958. Est. $27,500. CD 3/13.

ONTRACTS AWARDED

Mass., Danvers—Town Water & Sewer omrs. Town Hall, lateral sewers, Tapleville ection, own forces, $25,000.

Mass., Palmer—Town Bd. Selectmen, Town all, sanitary sewers, Chestnut, Hill and horndike Sts., day labor. $27,000.

Ont., Leaside—Town, R. V. Talbot, clk., 11 Bessborough Dr.; installing sewers in arious streets, to Grant Contg. Co., Ltd., 26 ueen St. E., Toronto, about $40,000. CD /15/44

BRIDGES

ROPOSED WORK

†Va., Yorktown—Yards & Docks, Navy pt., 18 St. and Constitution Ave. N.W., ash. 25, D. C., bridge over Felgate Creek, 40,000; concrete paving Lee Rd., $90,000, t Naval Mine Depot.

Alberta—Province of Alberta, Edmonton, teel bridges, at Rocky Mountain House, 350,000 voted; at Smith, $250,000 voted. pt. P. Wks., Edmonton, engrs.

Ont., Napanee—Municipality, subway or overhead bridge, Hamburg Rd. $40,000.

★**Que., Sherbrooke** — City, and Dpt. P. Wks., Quebec City, 2,000 ft. bridge over St. Francis River connecting east and west wards. $500,000. J. C. Cote, city engr.

BIDS ASKED

Bids Asked April 10

Mass., Boston—City, P. Wks. Dpt., City Hall, construction work on Allston Bridge over Boston & Albany R. R. $50,000. Plans deposit $2.

Bids Asked May 7

Que., St. Luc—J. Pouliot, municipality clk., St. Luc, bridge over Des Fleurs River. $30,000. Dpt. P. Wks., Quebec City, engr.

LOW BIDDERS

Pennsylvania—State Dpt. Hys., Harrisburg, Mar. 27, repairing existing bridge over Allegheny River, Forest Co., from A. J. Fasenmyer, 10 Security People's Bldg., Erie $35,746. CD 3/20—ENR 3/22.

CONTRACTS AWARDED

La., Galliano—Police Jury of LaFourche Parish, in office of C. J. Conlon, secy., Thibodaux, pontoon bridge over Bayou LaFourche, to McWilliams Dredging Co., 812 Gravier St., New Orleans, $24,983. Bids 3/28. CD 2/27—ENR 3/1.

New Jersey—The Central R. R. Co. of N. J., A. M. Zabriskie, ch. engr., Jersey City Terminal, Jersey City, Zone 2, alterations, repairs to 2 bridges, replacing piles and fenders on Newark-Bayonne Bridge and on Newark-Kearny Bridge, Essex and Hudson Counties, to Allen Spooner & Son, Inc., Pier 2, North River, New York, N. Y., $34,870.

STREETS AND ROADS

BIDS ASKED

Bids Asked April 10

West Virginia—State Rd. Comn., Charleston, grading, draining, concrete paving, guard rail and bridge 1.467 mi. Reed-Malden Rd. and accessories. U. S. Route 60, Federal Aid Access and Strategic network projects DA WI-3-C(1) and SNAFA 221-1(1), concrete rigid girder span 32 ft., Malden Highway Underpass 1718 (US Route 60), Defense Access Project DAWI-3-C(1), both Kanawha Co.

Bids Asked April 11

†Georgia—State Hy. Bd., Atlanta, grading, surface treating 1.492 mi. Dublin Airport to U. S. Route 80 Rd., Laurens Co.; concrete culverts, headwalls Eastman-Dublin Rd., Dodge Co.; widening, resurfacing present paving 6.18 mi., grading, surfacing 1.9 mi. Coweta Co.; grading, 5.251 mi. Statesboro-Pembroke Rd., Bulloch Co.; resurfacing, widening shoulders 4.881 mi. Bibb and Twiggs Counties.

Bids Asked April 12

Virginia—Commonwealth of Virginia, Dpt. Hys., Richmond, soil or sand clay surface treating 1.197 mi. Route 68, S.P. DA-NR-1362-L, Fed. Proj. DA-NR 76-A(1), King George Co.; surface treating (scarifying and reshaping) 3.237 mi. Route 640, S. Proj. DA-NR-1366-L, Fed. Proj. DA-NR-75-A(1), Westmoreland Co.; furnishing, del., applying 394.731 tons bituminous plant-mixed materials.

Bids Asked April 13

Minnesota—State Hy. Dpt., at District Office, Brainerd, loading, hauling about 1,400 cu yd. and crushing, screening, loading, and hauling about 15,520 cu. yd. gravel for production of mineral aggregate for gravel surfacing and for stockpiles for Maintenance Div., Brainerd. $25,000. O. L. Kipp, ch. engr. State Hy. Dpt., St. Paul.

Minnesota—State Hy. Dpt., St. Paul, applying approx. 3,110,000 gal. bituminous material for Maintenance Dists. 1, 2, 3, 5, 6, 8, 12, 14, 15, and 16, St. Paul. $50,000. O. L. Kipp, ch. engr.

Bids Asked April 16

Minnesota—State Hy. Dpt., at District Office, Detroit Lakes, crushing, screening, loading, hauling about 16,260 cu. yd. gravel for production of mineral aggregate to be placed in stockpiles for Maintenance Div., Detroit Lakes. $25,000. O. L. Kipp, ch. engr. State Hy. Dpt., St. Paul.

N. J., Mays Landing—Town, Town Hall, bituminous surface treating, Estelle Ave., involving 15,600 gal., bit. material, 19,555 sq. yd. sand cover. J. M. Adams, 305 Central Ave., Hammonton, engr.

Bids Asked April 17

Minnesota—State Hy. Dpt., at District Office, Morris, crushing, screening, loading and hauling about 23,360 cu. yd. gravel for gravel surfacing and stockpiles for production of mineral aggregate for Maintenance Div., Morris, $32,060. O. L. Kipp, ch. engr. State Hy. Dpt., St. Paul.

Washington—State Hy. Dpt., Olympia, grading, draining, constructing embankment on 1.59 mi. Primary State Hy. 1, Kalama to Kalama River, FAP No. SN-U-FAP147H, unit 1, Cowlitz Co.; stockpiling, crushed stone surfacing and mineral aggregate on Primary State Hy. 5, Enunclaw to the Dalles, King and Pierce Counties. Plans deposit $2. C. E. Hickey, state hy. dir.

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STREETS AND ROADS (Bids Asked, Cont'd.)

Bids Asked April 18

California—State Div. Hys., Sacramento, plant mix surfacing roadbed and constructing shoulders of imported borrow ,on 7.1 mi. road between Roseville and Lincoln, Placer Co. G. T. McCoy, Sacramento, state hy. engr.

Minnesota—State Hy. Dpt., at District Office, Marshall, crushing, screening, loading and hauling about 25,130 cu. yd. gravel for production of mineral aggregate to be placed in stockpiles for Maintenance Div., Marshall. $33,000. O. L. Kipp, ch. engr. State Hy. Dpt., St. Paul.

Bids Asked April 19

California—State Hy. Div., State Bldg., Los Angeles, road mixed surfacing 1 mi. between South Gate of Seeley Airport and Rt. 12 and 5.4 mi. bituminous surfacing between Route 187 and Holtville Airport, Imperial Co.; road mix repairing 12.7 mi. State Hy. Rt. 64, between Desert Center and Black Butte, Riverside Co. G. R. McCoy, Sacramento, engr.

Bids Asked About May 27

Ind., Indianapolis—City, City Hall, resurfacing 34, Prospect and Morris Sts., State and Fletcher Aves. $195,000.

Bids Asked

Calif., San Lorenzo—Greenwood Corp., 859 San Mateo Dr., soon lets contract, imprv. streets. E. H. Smith, City Hall, Menlo Park, engr.

Bids Asked

Tennessee—State Hy. Dpt., Nashville, rejected bids Mar. 23, imprv. 5.498 mi. State Hy. 61, DA-WI 31-A(1), 6.772 mi. State Hy. 9, SN-FAP 82-A(3), both Anderson Co. CD 3/28—ENR 3/8.

Washington—C. D. Hickey, dir. State Hy. Dpt., Olympia, bids soon clearing, grading, filling section Primary State Hy. 1 between Kalama and Kalama River. Bids Mar. 20 rejected. CD 3/27—ENR 3/29, under LB.

★**Man., Kenton**—Chas. Motheral, Kenton, grading 8 mi. roads, for Woodworth Rural Municipality. $500,000.

LOW BIDDERS

†**D. C., Wash.**—District Comrs., District Bldg., Mar. 22, imprv. alleys, sidewalks, curbs and gutters at Bass Place S.E., Benning Rd., 49 and East Capitol Sts., from Highway Engr. Constr. Co., 7 and T Sts. N.E., Wash., D. C., **$32,870. FWA.**

Louisiana—Dpt. Hys., Baton Rouge, Mar. 28, imprv. 16.131 mi. S.P. 11401-05, Vernon Parish, from Horton-Pollard, Bossier City, **$84,112.** CD 3/19—ENR 3/22.

★**Michigan**—State Hy. Dpt., Lansing, Mar. 22, bituminous concrete resurfacing 6.038 mi. SM 23-14C-2, SM 23-11C-5, SM 23-18C-2, on M-78, from west limits of Charlotte to U. S. 27, Charlotte on M-78, S.W. and on M-78 in Bellevue, Eaton Co., and 4.944 mi. SM-19-12C-3, SF 34-4C-3, SM 34-3C-Y on U. S. 16, from west county line in Clinton Co. Village of Cortland, Clinton and Ionia Counties, from Wright Constr. Co., Williamston, **$105,288** and **$79,539** respectively ***2.396 mi. SM-3-4C-9, SM-3-3C-6, SM-41-29C-2 on U. S. 131, north and south of Wayland from Allegan-Kent Co. line, Allegan and Kent Counties, from Grand Rapids Asphalt Paving Co., 402 Houseman Bldg., Grand Rapids, **$44,560*****8.995 mi. SM 30-6C-7 on U. S. 112 from Jonesville Southwest to county line, Hillside Co., from Michigan Asphalt Paving Co., 720 E. Ten Mile Rd., Royal Oak, **$160,823*****5.107 mi. SM 58-2C-19 on U. S. 24 from point north of Michigan-Ohio Line north to M-151, Monroe Co., from Detroit Asphalt Paving Co., 702 Transportation Bldg., Detroit, **$159,913*****3.774 mi. SM-58-15C-10 on U. S. 24 from M-130 N.E. to U. S. 25, Monroe Co., from Cooke Contg. Co., 1216 Penobscot Bldg., Detroit, **$121,728.**

Minn., Winona—Winona Co., R. Schoonover, aud., Mar. 6, furnishing, applying bituminous material on county roads from H. J. Dunn, Route 2, Winona, **$27,314.**

Ohio—State Hy. Dpt., Columbus, Mar. 27, imprv. 6.843 mi. Miami Co., from Fenton Constr. Co., Box 445, Ashland, **$137,944**, est. $138,310***2.323 mi. Allen Co., from Churchill Constr. Co., 1126 State St., Lima, **$31,990**, est. $32,150***0.337 mi. Stark Co., from General Asphalt Paving Co., 307 Kahler Bldg., Canton, Zone 2, **$25,125**, est. $28,130***1.643 mi. Muskingum Co., from Hurst Constr. Co., 226 Masonic Temple, Zanesville, **$34,621**, est. $34,700***0.468 mi. Brown Co., from DeSalvo Constr. Co., 3666 Erie Ave., Cincinnati, Zone 8, **$110,788**, est. $122,200. Received no bids Mar. 27, imprv. 2.37 mi. Adams Co. CD 3/13—ENR 3/22.

★**Texas**—State Hy. Comn., Austin, Mar. 28, from L. H. Lacy & Co., 3009 N. Henderson Ave., Dallas, imprv. 10.28 mi. Angelina Co., **$74,375**; 8.892 mi. Colin Co., **$100,830**; 16.52 mi. Guadalupe Co., **$171,373**; 10.094 mi. San Augustine and Sabine Counties, **$52,451**; 9.277 mi. Wichita and Archer Counties, **$104,321**; 18.846 mi. Wilbarger and Wichita Counties, **$195,179**; 25.072 mi. Wood, Cherokee, Anderson and Rusk Counties, **$151,755*****from Public Const. Co., Denton, 28.706 mi. Bailey, Lamb and Hockley Counties, **$95,342**; 59.754 mi. Baylor, Clay, Wichita, Throckmorton and Young Counties, **$49,208**; 25.259 mi. Parmer and Castro Counties, **$79,280**; 19.741 mi. Wilbarger and Wichita Counties, **$77,750**; 14.261 mi. Young and Throckmorton Counties ,**$37,643*****from Uvalde Const. Co., 2400 Uvalde St., Dallas, 3.857 mi. Dallas Co., **$29,859**; 31.319 mi. Reeves, Ward, Ector and Midland Counties, **$149,761*****from Texas Bitulithic Co., 111 Commerce St., Dallas, 16.301 mi. Bowie and Cass Counties, **$111,299** ***from J. C. Vowell, P. O. Box 253, El Paso, 3.256 mi. El Paso Co., **$56,595*****from Tulsa Rig & Reel Mfg. Co. and Drake Const. Co., Muskogee, Okla., 64.665 mi. Brooks, Hidalgo, Willacy and Jim Hogg Counties, **$48,100***** from D. & H. Const. Co., Route 5, Box 160-B, Dallas, 54.353 mi. Gray, Carson and Hutchison Counties, **$50,446*****from C. Hunter Strain, San Angelo, 60.618 mi. Terrell, Pecos, Ward and Midland Counties, **$68,052*****from H. Page, Fiskville Rd., Austin, 5.39 mi. Tom Green Co., **$27,162.** CD 3/16 and 3/19.

Tex., Houston—City, c/o M. H. Westerman, secy., Mar. 28, paving Trempter, Kress and Woolworth Sts., from L. V. Miller, 823 First Natl. Bank Bldg., **$31,259.**

Virginia—State Dpt. Hys., Richmond, Mar. 22, from J. R. Ford Co., Inc., Lynchburg, furnishing, applying bituminous material and applying state owned covering material 302,000 gal. **11.3c.** per gal., 958,900 gal. at **11.93c.** per gal., 57,392 tons at **$2.04** per ton; 180,000 gal. at **12c.**, 336,000 gal. at **13c.** and all foregoing at Lynchburg***from G. B. Pace, Hampton, Va., furnishing, applying bituminous material and state owned covering material 55,951 gal. at **11c.**, 41,961 gal. at **11.5c.** and 4,200 tons at **$1.85** per ton, all foregoing at Suffolk; 123,200 gal. at **12c.** per gal. at Staunton***from W. M. McIntosh, Inc., North Blvd. and Ellen Rd., Richmond, furnishing, applying bituminous material and state owned cover material 92,600 gal. at **11.2c.** per gal., 569,200 gal. at **11.7c.** per gal., 31,790 tons at **$2.05** per ton; 222,500 gal. at **11.5c.** per gal., 469,200 gal. at **11.8c.** per gal., all foregoing at Richmond***from Sam Finley, Inc., Roanoke, furnishing, applying bituminous material and applying state owned covering material 46,397 tons at **$2.23** per ton, 508,400 gal. at **10.97c.** per gal., all foregoing at Salem***from Virginia Asphalt Co., Inc., Roanoke, furnishing, applying bituminous material and covering material 260,000 gal. Schedule 1, **13c.** per gal., 112,000 gal. at **13.5c.** per gal., 289,000 gal. at **13.9c.** per gal. and 23,130 tons at **$5.79** per ton, all foregoing Schedule 3, Bristol***from Pendleton Construction Corp., Wytheville, 16,519 tons Schedule 1 at **$5.20** per ton, at Bristol ***from F. D. Cline, Greensboro, N. C., furnishing, applying bituminous material and application of state owned covering material 324,410 gal. at **11.2c.** per gal., at Salem, furnishing, applying bituminous material and covering material 106,000 gal. at **14c.**, 244,000 gal. at **14.5c.**, and 19,214 tons at **$5.85** per ton, Schedule 2 at Bristol; 180,000 gal. at **12c.** per gal., 336,000 gal. at **13c.** per gal, and 24,299 tons at **$5.38** per ton, at Lynchburg***from W. M. McIntosh, Inc. and The James Gibbons Co., North Blvd. and Ellen Rd., Richmond (alternate bid), furnishing, applying bituminous material and state owned covering materials 138,700 gal. at **11.9c.** per gal., 740,700 gal. at **11.9c.** per gal., 39,217 tons at **$2.43** per ton (regular bid) furnishing, applying bituminous material 138,700 gal. at **12.9c.** per gal., 740,700 gal. at **12.9c.** per gal., all foregoing at Fredericksburg***from A. B. Torrence & Co., Elkton, furnishing, applying bituminous material and applying state owned covering material 329,600 gal. at **12.4c.** per gal., **27,630** tons at **$1.50** per ton at Staunton***from Union Bldg. & Constr. Corp., 631 Main Ave., Passaic, N. J., 206,546 gal. at **10c.** per gal., 435,672 gal. at **10.3c.** per gal., 40,885 tons at **$1.95** per ton at Culpeper***from Carter Bros., Inc., 2924 West Marsh St., Richmond, furnishing, applying bituminous and covering material 40,000 gal. at **13.5c.** per gal., 340,000 gal. at **13.9c.** per gal. and 25,880 tons at **$5.57** per ton, Schedule 4, at Bristol***from Nelson H. Clark & Sons, Inc., Luray, Va., 241,000 gal. at **12c.** per gal., 71,000 gal. at **12c.** per gal., 16,500 tons at **$4.50** per ton, at Staunton*** from Tar Asphalt Service, Inc., Silver Lake Ave., New Brunswick, N. J., 298,040 gal. at **9.9c.** per gal., 768,840 gal. at **9.93c.** per gal., at Culpeper***from Short & Thompson, Inc., Hopewell, 446,975 gal. at **12c.** per gal., 870,742 gal. at **12c.** per gal., 61,585 tons at **$5.53** per ton, at Suffolk. CD 3/13—ENR 3/15.

Virginia—State Dpt. Hys., Richmond, Mar. 27, imprv. 2.14 mi. Louisia Co., from B. W. Jackson Contg. Co., 1009 W. Graham Rd., Richmond, **$25,476.** CD 3/16—ENR 3/22.

CONTRACTS AWARDED

Alabama—State Hy. Dpt., Montgomery, to W. M. Ford Constr. Co., Lafayette, imprv. 15.164 mi. DeKalb Co., **$203,665**; 21.685 mi. Marion Co., **$152,695**; 5.95 mi. DeKalb Co., **$43,903*****to Vandigriff Constr. Co., 4708 N. Court St., Montgomery, 7.816 mi. Pike Co., **$88,843.** Grand total $489,106. CD 3/13—ENR 3/15.

Conn., Hartford—City, Bd. Contr. & Supply, Municipal Bldg., sheet asphalt wearing surface patching and repairing, 57,000 sq. yd., to Edward Balf Co., 173 State St., **$79,000.** Bids 3/27. CD 3/22.

Georgia—State Hy. Dpt., R. G. Clay, dir., Atlanta, imprv. 16.377 mi. Troup Co., to W. L. Cobb, Inc., Decatur, **$385,601.** Bids 3/30. CD 3/23.

Mass., Northbridge—Town Rd. Comn., Town Hall, highway repairs, new roads, sidewalks, own forces, **$29,500.**

Minn., Le Center—Le Sueur Co., C. L. Huebl, aud., graveling various roads, to O. Zarnott, Gaylord, **$53,445.** Bids 3/6.

New Mexico—At office F. G. Healy, st hy. engr., Santa Fe, imprv. 6.165 mi. To rance and Guadalupe Counties, to Skou Constr. Co., Springer Bldg., Albuquerq **$51,841*****9.81 mi. San Juan Co., to J. Skousen, Springer Bldg., Albuquerque, $7 **667*****8.778 mi. Lincoln Co., to E. M. Silve Box 336, Albuquerque, $135,244. Grand tot $257,752. Bids awarded 3/29.

Tex., San Antonio—City, widening, asphal paving West Ave., force account. $25, T. Coghill, city engr.

Virginia—Dpt. Hys., Richmond, impr 12.52 mi. Gloucester Co., to T. E. Ritter C Inc., 426 W. York St., Norfolk, $103,71 Bids 3/27. CD 3/16—ENR 3/22.

Ont., Kitchener—Waterloo Twp., P. Snider, clk., R.R.3, graveling roads, da labor. **$30,000.**

Ont., Windsor—Essex Co. Council, G. Doyle, chn., Roads Comn., Windsor, impr roads, own forces, **$160,000.** R. W. Knist County Bldgs., engr.

EARTHWORK, WATERWAYS

PROPOSED WORK

★†**Calif., Hunters Point**—Yards & Docks Navy Dpt., 18 St. and Constitution Ave N. W., Wash. 25, D. C., South breakwater at Naval Drydocks. $5,000,000.

†**Calif., San Diego**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W. Wash. 25, D. C., dredging, Naval Operating Base. $300,000.

★†**Calif., San Francisco**—Yards & Docks Navy Dpt., 18 St. and Constitution Ave N. W., Wash. 25, D. C., dredging San Francisco Bay. $2,000,000.

★†**Calif., San Pedro and Terminal Island**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C. dredging. $675,000.

†**Conn., New London** — Yards & Docks Navy Dpt., 18 St. and Constitution Ave N. W., Wash. 25, D. C., dredging, Submarine Base. $100,000.

†**Fla., Banana River** — Yards & Docks Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., dredging, Naval Air Station, $200,000.

†**Fla., Fort Lauderdale**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging. $200,000.

†**Fla., Key West**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave N. W., Wash. 25, D. C., dredging. $300,000.

†**Fla., Mayport**—Yards & Docks, Navy Dpt. 18 St. and Constitution Ave. N. W., Wash. 25, D. C., dredging. $100,000.

†**Fla., Pensacola**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., dredging, Naval Air Station. $200,000.

†**Me., Portland** — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., dredging, Naval Station, $25,000.

†**Md., Solomons Island**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., dredging. $100,000.

†**Mass., Boston** — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., dredging, Navy Yard. $200,000.

†**Mass., Squantum**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging channel and seaplane mooring basin, Naval Air Station. $55,000.

Minn., Olivia—Renville Co., C. A. Strom, aud., rejected bids Mar. 26, constructing County Ditch 101, furnish tile and dig, lay and backfill same, about 29,500 lin. ft. and 18 in. tile, etc. May readvertise. CD 3/14.

†**Miss., Gulfport**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., dredging, Advance Base Depot. $100,000.

†**N. H., Portsmouth**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., dredging, Navy Yard $100,000.

†**N. H., Portsmouth**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., waterfront protection of filled area, at Navy Yard. $300,000.

†**N. J., Cape May**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., bulkhead, ocean front, Naval Air Station. **$215,000.**

N. J., Keansburg—New Point Comfort Beach Co., Beachway, plans bulkhead, piers on beachfront. $20,000.

†**N. C., Cherry Point**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging, Marine Corps Air Station, $100,000.

†**Okla., McAlester**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., erosion control in earth-covered magazine area, Naval Ammunition Depot. $92,000.

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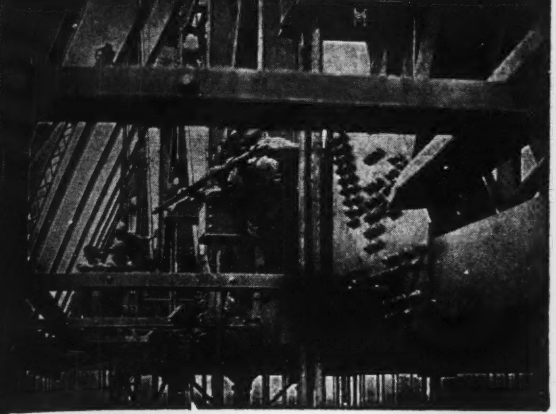

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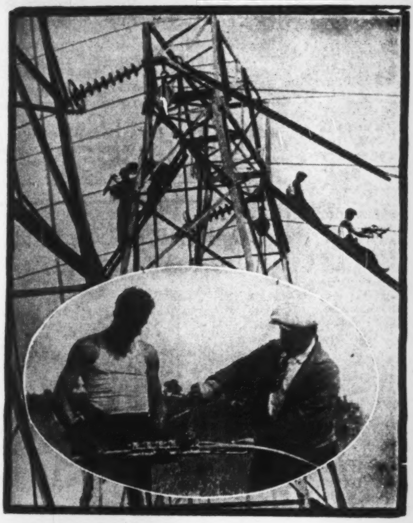

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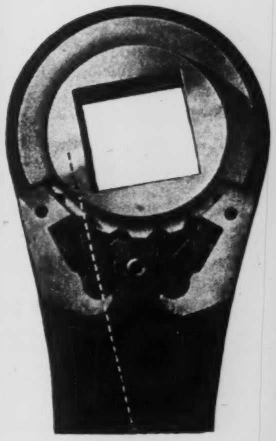

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EARTHWORKS and WATERWAYS (Proposed Work, Cont'd.)

†**R. I., Davisville**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging, Naval Advance Base Depot. $70,000.

R. I., Narragansett—State of R. I., Providence Plantations Div. Parks & Forests, State House, Providence, preparing plans bulkhead, etc., incl. large bulkhead and wall, constructing parking area, reconstructing bathhouse, Scarborough Beach. $60,000.

†**R. I., Newport**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging, $100,000.

†**S. C., Charleston**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging, Navy Yard, $300,000.

†**Tenn., Memphis**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., clearing, draining, sodding creek areas, and imprv. sewerage sys., Naval Air Technical Training Center. $35,000.

†**Tex., Corpus Christi**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging, Naval Air Station, $100,000.

†**Va., Norfolk**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., waterfront dredging, $225,000; reinforcing quay walls and dredging to 40 ft. Berths 1 and 2, $250,000, at Navy Yard.

★†**Wash., Puget Sound**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging, Navy Yard, $750,000.

†**Wash., Seattle**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., dredging inboard end of Piers 90 and 91. Naval Station. $100,000.

Alta., Coronation—Dominion Govt., Ottawa, Ont., dam 175 ft. high at Content Bridge, 103 mi. canal 24 ft. wide, 12 ft. deep. Dpt. P. Wks., Ottawa, Ont., engr.

B. C., Westview—Dpt. P. Wks., Ottawa, Ont., harbor imprvs. $231.000.

N. S., Parrsboro—Dpt. P. Wks., Ottawa, Ont., breakwater repairs. $65,000.

BIDS ASKED

Bids Asked April 10

Mass., Chatham—Dpt. P. Wks., 100 Nashua St., Boston, excavating channel and basin thru flats of Aunt Lydia's Cove. $25,000. CD 3/12—ENR 3/15.

Bids Asked April 19

Ia., Pocahontas—Bd. Supervs. Pocahontas Co., constructing Joint Drain Dist. 181, involving 135,000 cu. yd. excav., necessary clearing and grubbing. Over $25,000. A. L. Thornton, Pocohontas co. engr.

Bids Asked April 23

†**Mont., Glendive**—Bureau Reclamation, Terry, earthwork, pipelines, structures, intake pump. plant and laterals, Intake Project, 18 mi. northeast of here, Spec. 1801-D.

†**Tex., Dallas**—U. S. Eng., 231 W. Main St., Denison, levee repairs Dallas County Levee Imprvt. Dist. 6, East Fork Trinity River, incl. approx. 87,850 cu. yd. embankment, foundation, stripping and 440 m.g. sprinkler, Ser. 41-242-45-111. Extended date. CD 3/5—ENR 3/8.

Bids Asked April 27

Wis., Oakfield—Dodge County Farm Drainage Bd., R 2, Oakfield, 19,365 cu. yd. channel excav., 19,365 cu. yd. leveling spoil bank, 890 lin. ft. 8 in. and 1,000 ft. 6 in. tile. Plans deposit $2. C. C. Travis, 627 Natl. Exchange Bldg., engr.

LOW BIDDERS

Tex., Fort Worth—City, S. H. Bothwell, mgr., completing Martine Creek flood control, from Purvis & Bertram, 112½ W. 9 St., **$50,615.** W. O. Jones, dir. P. Wks.

†**Tex., Freeport**—U. S. Eng., 25 St. and Avenue F, Galveston, Mar. 27, steel sheet pile guide wall at Brazos River crossing of Gulf Intracoastal Waterway, Ser. W-41-243-eng-45-C13, from C. C. Reid, P. O. Box 107, West Columbia, **(A) $43,410; (A and B) $86,821; (A and C) $47,676.**

CONTRACTS AWARDED

★†**Calif., Alameda**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., breakwater at Naval Air Station, Spec. 15924, NOY 11619, to Basalt Rock Co., Inc., 900 Eighth St., Napa, **$1,094,338.** CD 3/27, under LB.

Ont., Wallaceburg—Dpt. P. Wks., Ottawa, shore protection along Lake Huron and St. Clair R, to R. A. Blyth Constr. Co., Ltd., 7 St. Andrews Gardens, Toronto, about **$50,000.**

LATIN AMERICA

Brazil, Sao Paulo—Companhia Mogiana de Estradas de Ferro, Sao Paulo, plans imprv. meter-gage lines, incl. bridges, easement of grades, straightening line, etc. $9,000,000.

British Guiana, Georgetown—Barclay's Bank, St. James St., Montreal, Que., plans bank and office bldg. Over $150,000.

British Guiana, Georgetown—Royal Bank of Canada, St. James St., Montreal, Que., Canada, plans bank and office bldg. Over $150,000.

Chile, Puerto Montt—Chilean State Ra ways, Santiago, Chile, plans bridge. $200,0

Chile, Santiago—Chilean State Railwa Santiago, plans centralized signal sy $4,000,000.

Chile, Santiago—Chilean State Railwa Santiago, plans modernizing machine shop etc. $200,000.

Chile, Temuco — Chilean State Railway Santiago, plans electrification Alameda Chillan Branch Line. $1,500,000.

Cuba—Republic of Cuba, Havana, makin plans irrigation project at Hondo, $300,0 irrigation project at Zaza, $1,000,000; mak ing surveys dam on Moron River, Camague $200,000; dam on Canto River, Oriente $150,000; plans completed irrigation syste at Yara, $350,000; receiving bids irrigatio system at Buey, $350,000. Comision Nacion de Fomento, Havana, engr.

Cuba, Havana — Compania Cubana Electricidad, Havana, plans 50,000 steam operated generating unit. $7,000,0

Cuba, Marianao—Municipality, plans wate sys. $300,000.

Cuba, Marianao—Municipality, plans sew erage sys. $390,000.

Cuba, Pastelillo—Consolidated R.R., Pa telillo, plans concrete wharf on Neuritas Ba $150.000.

Cuba, Pinar del Rio—Public Service Elec tric Power Co., Pinar del Rio, plans powe plant exten. $60,000.

Cuba, Santiago de Cuba—Republic of Cub Havana, plans sanitary system. $1,000,00

Ecuador, Ambato — Municipality, pla electric light and power plant, $200,000.

Haiti, Port au Prince—Government Haiti, and Municipality of Port au Prince plan housing. $500,000.

Haiti, Port au Prince—Haitian Republi Port au Prince, plans stadium. $100,000.

Mexico—State of Jalisco, Capital, Guadala jara, will complete 11 kilometers of Guadala jara Barra de Navidad Rd., by own force Est. $100,000.

Mexico, Mexico City—Republic of Mexico Mexico city, plans radio-telegraph station $500,000.

Mexico, Monterrey — Cia Fundidora Fierro, Monterrey, receiving bids steel an iron works addn. $4,000,000.

Mexico, Nogales—City, City Hall, wil modernize waterworks, by day labor. $850,-000.

Mexico, San Luis Potosi—City of San Lui Potosi, G. del Campo, mayor, plans wate system and drainage. $1,250,000.

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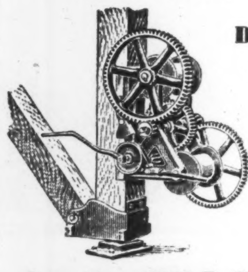

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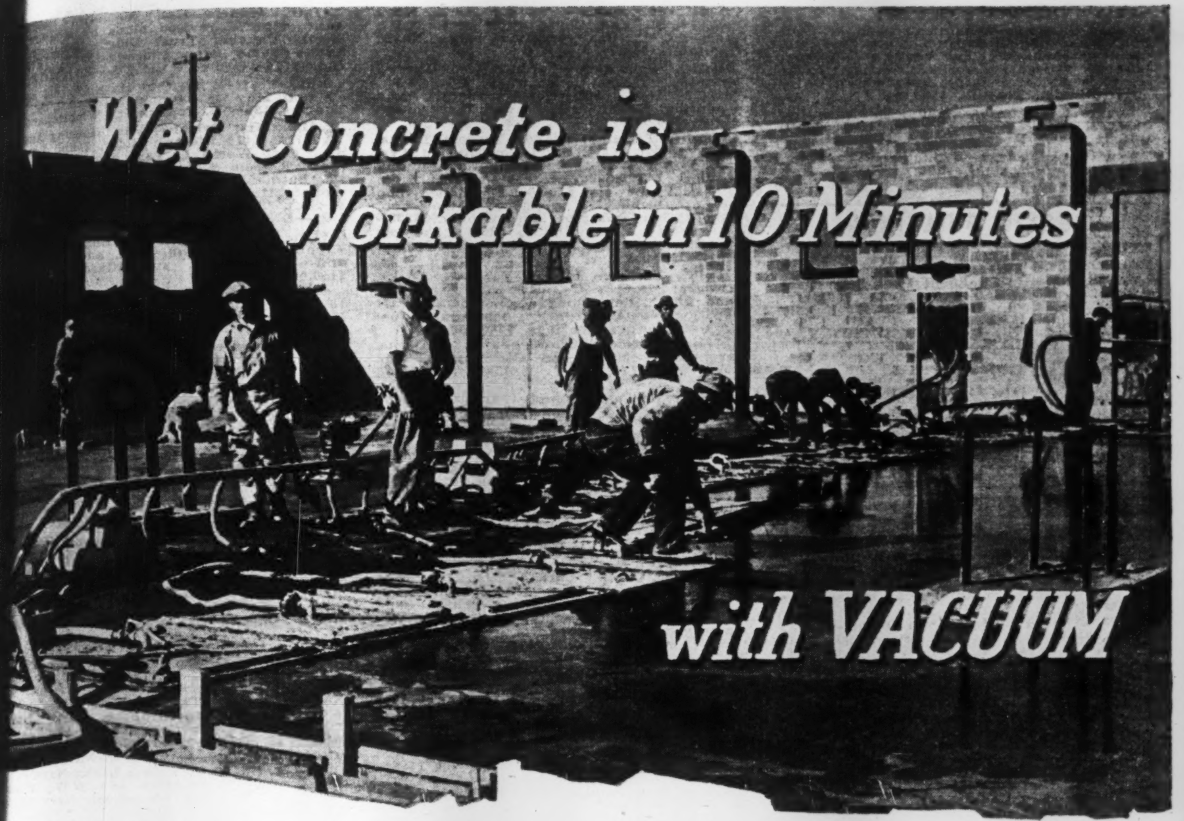
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LATIN AMERICA (Cont'd.)

Santo Domingo—Dominican Republic, Dpt. Pub. Wks., Ciudad Trujillo, plans dredging, dock, warehouses, at **San Pedro de Macorco**; $250,000***irrigation works throughout country $3,000,000***dredging, breakwater, warehouse, **Ciudad Trujillo**, $500,000.

Venezuela, Caracas—Republic of Venezuela, Caracas, plans military college, $3,300,000. Dpt. P. Wks., Caracas, engr.

Venezuela, Caracas—Republic of Venezuela, Caracas, plans normal school, $990,000. Dpt. P. Wks., Caracas, engr.

PUBLIC BUILDINGS

PROPOSED WORK

†Ariz., Phoenix-Litchfield Park-Salt River Valley—Pub. Housing Auth., NHA, 760 Market St., San Francisco, Calif., 250 family dwelling units, Ariz. 2379.

†Ark., Pine Bluff—Pub. Housing Auth., NHA, 1411 Electric Bldg., 7 and Lamar Sts., Fort Worth 1, Tex., plans by Erhart & Eichenbaum, Little Rock, 50 family housing units, Ark. 3-144. $40,000. CD 3/15—ENR 3/22.

†Calif., Albany—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. bldgs., $150,000; paving roads and soil stabilization, $100,000, at Naval Landing Force Equip. Depot.

†Calif., Beaumont—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., recreation bldg., Naval Convalescent Hospital, $184,000.

†Calif., Camp Elliott—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., drill hall and gymnasium, $151,000; new training devices, $100,000, at Naval Training and Distribution Center.

†Calif., Camp LeMesa (San Diego)—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., chapel for 400, Naval Retraining Command, $60,000.

†Calif., Fallbrook—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., barricaded loaded ammunition truck storage, $180,000; bachelor officers' quarters, $35,000; electric automatic truck and battery shop, $87,000; 2 addnl. barracks, $54,000; 2 inert storehouses, $170,000, at Naval Ammunition Depot.

★**†Calif., Hunters Point**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., optical, radio, gyro, and fire control bldg. exten., $710,000; industrial hygiene and material laboratory, $248,000; shipfitters structural shop, $5,465,000; relocating blacksmith shop and to provide foundry facilities, $120,000; ships' storage bldg., $158,000; paint shop, $153,000; ordnance stowage bldg., $665,000; apprenticeship training school, $335,000; cafeteria (south area), $195,000; Shop Service Bldg. 2, $429,000; supply storage warehouse, $4,000,000; addnl. paving, $340,000; regrading intersection at Robinson and Fisher Aves., $150,000, at Naval Drydock.

†Calif., Mare Island—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., bldg. for central packing section, $285,000; addnl. cold storage bldg., $92,000; storage shed for inert paint ingredients, $313,000, at Navy Yard.

★**†Calif., Mare Island—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave.** N.W., Wash. 25, D. C., paint materials storage bldg., $275,000; Electroplating Plant Bldg. 225, $38,000; replacement, resurfacing pavements and working areas, $500,000; recreation bldg., $184,000; fire fighters school $25,000, at Navy Yard.

†Calif., Oceanside—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., gymnasium, Amphibious Training Base, $78,000.

†Calif., San Diego—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., fire fighters school, Naval Operating Base, $25,000.

★**†Calif., San Diego—Yards & Docks, Navy** Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., office bldg. for industrial command, $250,000; exten. pipe shop, electrical shop, sheet metal shop, $1,250,000, at Naval Repair Base.

†Calif., San Francisco—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., bldg. repairs, Damage Control School. $50,000.

†Calif., San Pedro—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., altering facilities, Frontier Base, $100,000.

Calif., Santa Monica—Bd. Educ., Santa Monica, plans by J. M. Estep, 236 24 St., 1 story, frame, stucco Grant School addns. $150,000. CD 12/28—ENR 1/11, under Postwar Projects.

†Calif., Shoemaker—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., gymnasium addn. to Recreation Bldgs. 39 and 88, $273,000; chief petty officers' quarters addn., Bldg. 59, $73,000; ten-unit prosthetic laboratory, $64,000; medical subsistence bldg. addn., $32,000; addn. to Bldg. 63 for small stores, $52,000; personnel embarkation sheds, $36,000, at Construction Battalion Replacement Depot, Camp Parks.

†Calif., Shoemaker—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., recreation bldg., Naval Hospital. $184,000.

†Calif., Shoemaker—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., conversion contractors camp to housing, Naval Training and Distribution Center, $66,000.

★**†Calif., Terminal Island**—Yards & Docks, **Navy Dpt., 18 St. and Constitution Ave.** N.W., Wash. 25, D. C., receiving and shipping warehouse, $266,000; rearrangement Bldg. 50, $82,000; foundry, $500,000; ordnance shop west of Drydock 3, $803,000; radio shop, $650,000; bar and pipe storage bldg., $238,000; carbide storage bldg., $35,000; paving miscellaneous areas and streets, $200,000, at Naval Drydocks.

†Calif., Treasure Island—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave N.W., Wash. D. C., developing district small craft operating center, frontier base, incl. fuel and water barge moorings, $250,000.

†Calif., Treasure Island—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., firefighters school, $25,000.

†Calif., Treasure Island—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., recreation bldg., Disciplinary Barracks, $184,000.

†Calif., Treasure Island—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., rehabilitation barracks, Naval Training and Distribution Center, $134,000.

†Calif., Yosemite—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., 2 recreation and gymnasium bldgs., Naval Hospital, $120,000.

★**†Colo., Camp Carson (br. Colorado Springs)**—U. S. Eng., 909 17 St., Denver, converting station hospital to general hospital of 3000-bed capacity, converting housing to provide hospital for 4,500 convalescent patients, reconditioning bldg., altering ward bldg., U. S. Army General Hospital, $1,605,408.

★**†Colo., Denver**—U. S. Eng., 909 17 St., Denver, remodeling bldgs., providing storage space, procurement and installation all equip., etc. for loading and assembling incendiary bombs at Rocky Mountain Arsenal, $1,331,022.

†Colo., Fort Logan—U. S. Eng., 909 17 St., Denver, 2 barracks, $65,000.

†Conn., New London—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., main gate bldgs., Submarine Base, $30,000.

†D. C., Wash.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., exten. interior communications school bldg., Advanced Training Schools, Receiving Station, $75,000.

★**†D. C., Wash.**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. bldgs., Naval Ordnance Laboratory, $10,578,000.

†D. C., Wash.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., altering Bldgs. 172, 184, 195, 210, 212 and 218, $75,000; street imprvs., $350,000, at Navy Yard.

†Ga., Cedartown—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Zone 3, 35 family stop-gap dwelling units, Ga. 9182.

†Ga., Dallas—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Zone 3, 15 family stop-gap dwelling units, Ga. 9181.

★**†Ga., Saint Simons Island**—Yards & **Docks, Navy Dpt.,** 18 St. and Constitution Ave. N.W., Wash. 25, D. C., bachelor officers' quarters and mess, $450,000; classrooms and equip., $400,000, at Naval Training School.

★**†Fla., Daytona Beach**—U. S. Eng., Post Office Bldg., Savannah, Ga., bids soon construction and conversion at Army's Welch Convalescent Center, providing capacity for 3,500 convalescent patients, $1,900,000.

†Idaho, Pocatello—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., administration bldg. addn., $93,000; inflammable storehouse addn., $62,000; cafeteria addn., $27,000, at Naval Ordnance Plant.

†Idaho, Sun Valley—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., gymnasium, Naval Hospital. $78,000.

†Ill., Chicago—Bd. Educ., City Hall, addnl. school in Calumet Dist., $13,888. **FWA.**

Ill., Rock Island—Rock Island Co., Court House, **$375,000 bond election June 5,** rein.-con., **brick, stone hospital.**

★**†Ind., Charlestown—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago 6, Ill., plans by A. M. Strauss, 415 Cal-Wayne Bldg., Fort Wayne, 2,000 homes, schools, stores,** community facilities for employees of enlarged DuPont Powder Plant, $4,000,000.

★**†Ind., Crane**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., locker bldg. for projectile assembly, $30,000; bus and train depot, $75,000; addnl. garage facilities, $74,000; supply department warehouse, $280,000; enlarging pyrotechnic plant, $300,000; lunch and locker bldg., for tank and case overhaul group, $30,000, at Naval Ammunition Depot.

†Ind., Muncie—Ball Memorial Hosp Assn., Muncie, revised plans by McGuire Shook, Fletcher Trust Bldg., Indianapoli nurses home adn., Ind. 12-199-N. FWA Bids 2/16 rejected. CD 2/7—ENR 2/15.

Kan., Pratt—City, City Hall, $300,000 bond election May 3, municipal hospital, G. H Thomas, 125½ N. Topeka St., Wichita, archt

★**†La., New Orleans**—Pub. Housing Auth NHA, 1411 Electric Bldg., 7 and Lama Sts., Fort Worth 1, Tex., plans by Rosenthall, Kessels & Jones, 225 Carondelet St 250 hutments, La. 16-112, $650,000; 25 de mountabl staff houses, La. 16-113. Goda & Heft, Terminal Station Bldg., engrs. CD 3/22—ENR 3/29.

†La., New Orleans—U. S. Eng., 25 St. an Avenue F, Galveston, Tex., addnl. hospital and WAC bldgs. at LaGarde Hospital $150,000.

†Me., Portland—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., temporary storehouse, Naval Station $135,000.

†Md., Carderock—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., 2 model storage bldgs., David Taylor Model Basin. $150,000.

†Md., Indian Head—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., accessory structures, facilities for powder extrusion plant, Naval Powder Factory, $200,000.

†Md., Piney Point—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., chemical storage bldg., Naval Torpedo Testing Range, $50,000.

★**†Md., Port Deposit**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., revised boiler plant, Fifth Area, $35,000; shed for diesel and crane locomotives, $60,000; electrically operated steel substation, $49,000; public works shop bldg., $647,000, road drainage facilities, $341,000; paving half of drill field area, $30,000, at Naval Training Station.

†Md., Solomons—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., operations bldg. addn., $31,000; Warehouse 1 addn., $24,000, at Naval Mine Warfare Test Station.

†Mass., Boston—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., laboratory bldg., $380,000; utility bldg., etc. $110,000, at Navy Yard.

†Mass., Boston—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., fire fighters school, Navy Yard. $25,000.

†Mass., East Boston (Lockwood)—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., increased shop bldgs., Frontier Base. $50,000.

†Mass., Framingham—U. S. Eng., 31 St. James Ave., mess hall, No. 19-023-45-Neg-108.

★**†Mich., Detroit**—U. S. Eng., 500 Griswold **St., addnl. test cells** in connection with **augmentation of facilities** at Ford Motor Co., Lincoln Plant, increasing tank engine capacity. $500,000.

★**†Mich., Detroit—U. S. Eng.,** 500 Griswold **St., converting 4** Murray Corp. bldgs., **Clay and Aubin Sts., for use** by Detroit Transmission Plant. $500,000.

†Miss., Gulfport—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., steam engineering school and installing equip., Naval Training Center. $350,000.

†Nev., Hawthorne—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., power plant addn., $100,000; surveillance test bldg. addn., $30,000, at Naval Ammunition Depot.

★**†N. H., Portsmouth**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., overhauling industrial public utilities, replacing or removing temporary industrial bldgs., $300,000; imprv. power plant and electrical distr., $450,000, at Navy Yard.

†N. J., Earle — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., administration bldg. addn., $60,000; bachelor officers quarters, pier area, $63,000; roads, $150,000, at Naval Ammunition Depot.

†N. J., Fort Dix (br. Trenton)—U. S. Eng., 120 Wall St., New York 5, N. Y., bids soon to Personnel Center, alterations, addns. H. A Kelly & B. S. Gruze, 921 Bergen Ave., Jersey City, archts.

★**†N. J., Pedricktown**—U. S. Eng., 120 Wall St., New York, N. Y., 1 story, 40x128 ft., concrete block cafeteria. $50,000. Albright & Friel, Inc., 1520 Locust St., Phila., Pa., engr.

★**†N. H., Portsmouth**—Yards & Docks **Navy Dpt., 18 St. and** Constitution Ave. **N. W., Wash. 25, D. C.,** bldgs. for rehabilitation of prisoners and replacement old wooden bldgs., Navy Yards. $875,000.

†N. H., Portsmouth—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., recreation bldg., Naval Hospital. $60,000.

†N. M., Alamogordo—Pub. Housing Auth. NHA, 1411 Electric Bldg., 7 and Lamar Sts. Fort Worth 1, Tex., plans by W. C. Kurger, Santa Fe, 100 family stop-gap housing NM-29-188. $60,000. CD 3/21—ENR 3/29.

†N. M., Santa Fe—U. S. Eng., Albuquerque **hospital addns. $250,000.**

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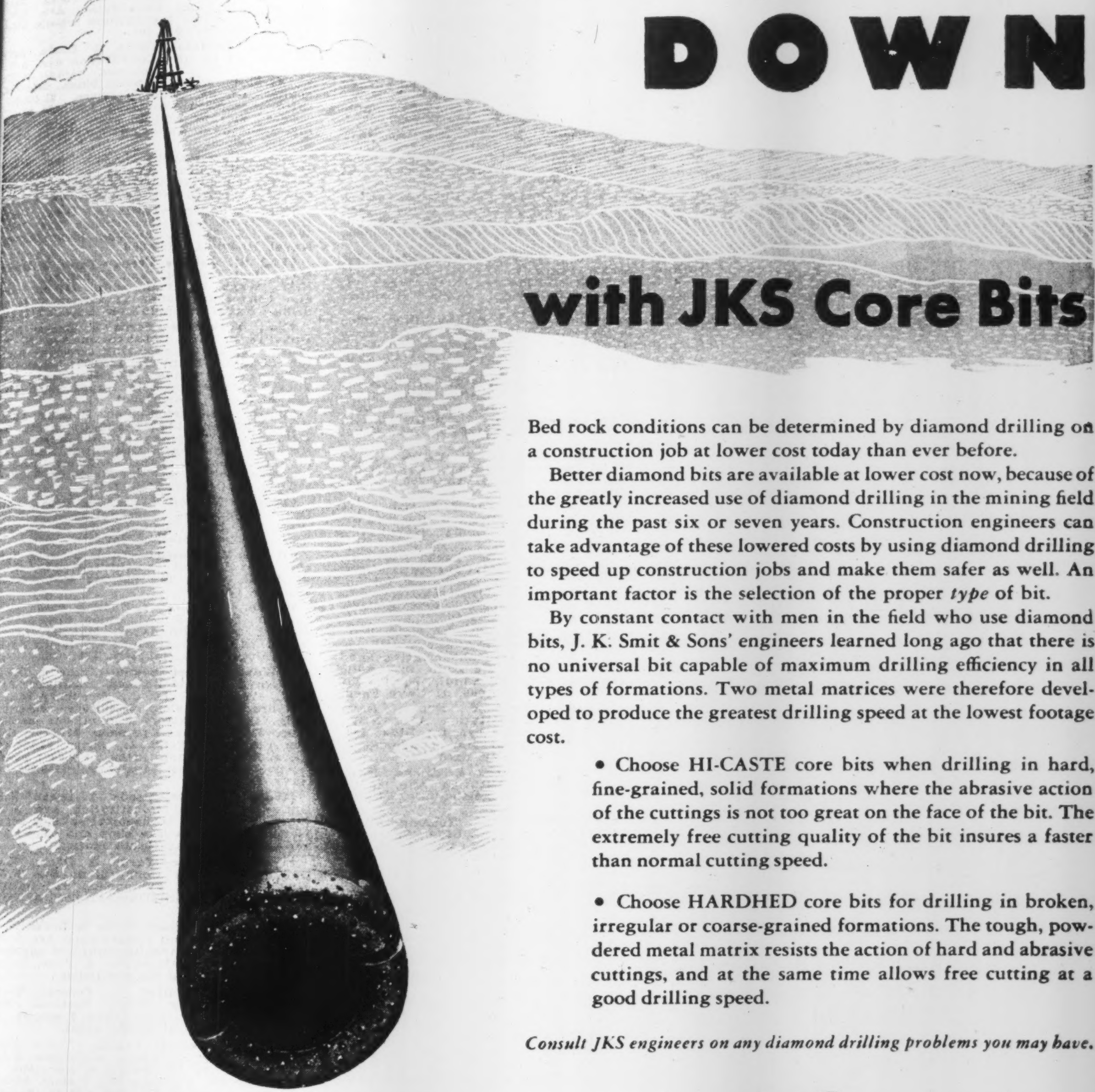

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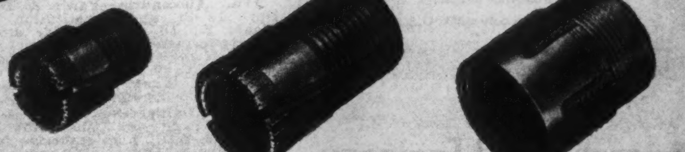

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

†**N. Y., Brooklyn**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., bldg. for Drydocks 5 and 6, $82,000; gasoline storage bldg., $41,000, at Navy Yard.

★ †**N. Y., Brooklyn**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., imprv. power plant, $195,000; public works garage, facilities, $730,000, at Navy Yard.

†**N. Y., Lake Seneca**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., rehabilitation barracks and roads, $260,000; Bethesda-type ward addns., $185,000, at Naval Training Station.

†**N. Y., Scotia**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., storehouse for inflammable materials, Naval Supply Depot. $300,000.

†**N. Y., Tompkinsville**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., increased storage space, $100,000; imprv. structures, $75,000, at Frontier Base.

★ †**N. C., Camp Butner (br. Durham)**—U. S. Eng., Post Office Bldg., Savannah, Ga., bids soon construction and conversion of Army Hospital, 5,500 bed capacity, $1,780,000. CD 2/14—ENR 2/22.

†**N. C., Camp Lejeune (New River, br. New Bern)**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., recreation bldg., Naval Hospital, $184,000.

†**N. C., Swannanoa**—U. S. Eng., Post Office Bldg., Savannah, Ga., postponed bids to have been opened Mar. 30, N. P. therapy and ward, at Moore General Hospital, MOG-7-45. Will readvertise. CD 3/7—ENR 3/15.

†**Okla., McAlester**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., administration bldg. addn., $67,000; addnl. battery charging station, $70,000; road imprvs., $126,000, at Naval Ammunition Depot.

†**Ore., Astoria**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., chapel for 200, Naval Hospital. $40,000.

†**Pa., Fort Mifflin**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., transfer bldg., Naval Ammunition Depot. $75,000.

★ †**Pa., Mechanicsburg** — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., storehouse for inflammable materials, $596,000; bachelor officers quarters for 200 officers and technicians, $230,000, at Naval Supply Depot.

★ †**Pa., Phila.**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., public works transportation shop garage, $400,000; Bldg. 576 addn. for public works storage, $68,000; addnl. equip. for central power plant, $799,000, at Navy Yard.

†**Pa., Phila.** — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., heating sys. for Bldg. 541, $90,000; acetylene and oxygen cylinder service bldg., $50,000, at Navy Yard.

†**R. I., Newport**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., recreation bldg., Naval Hospital, $184,000.

†**S. C., Winnsboro**—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta 3, Ga., 50 family stop-gap dwelling units, S. C. 38084.

†**S. C., Charleston**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., storage shed and sheet pile bulkhead, Naval Ammunition Depot. $75,000.

†**S. C., Charleston**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., electroplating shop bldg., Navy Yard, $34,000; paving replacement, incl. drainage, $100,000.

★ **Tex., Borger**—L. J. Roberts, pres. Borger Ind. School Dist., Borger, plans by M. O. Carder, 317 Fisk Bldg., high school. $722,326. Applied for FWA funds.

†**Tex., McKinney**—U. S. Eng., 231 W. Main St., Denison, occupational therapy and physiotherapy bldg., etc. and library, Ser. 42-242-45-113. $150,000.

†**Tex., Texarkana**—Pub. Housing Auth., NHA, 1411 Electric Bldg., 7 and Lamar Sts., Fort Worth, Zone 2, 100 family dwelling units, Tex. 41699.

†**Utah, Clearfield**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., welfare bldg. for station personnel, $390,000; gymnasium, $78,000, at Naval Supply Depot.

†**Va., Alexandria**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., chemical storage bldg., Naval Torpedo Station. $75,000.

†**Va., Camp Peary (Williamsburg)**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., chapel for 400, at Naval Retraining Command. $60,000.

★ †**Va., Dahlgren**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave., N.W., Wash. 25, D. C., high explosive fusing house, shell house, and case house and storage platforms in ammunition department area, $527,000; main battery storehouse and gun workshop, $250,000; supply storage bldg., $60,000; second story on supply warehouse, $30,000, chapel for 200, $40,000, at Naval Proving Ground.

★ †**Va., Front Royal**—Warren Co. School Bd Front Royal, school, $38,400. **FWA.**

★ †**Va., Norfolk**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. storage in Bldg. 90, $160,000; public works shop, $500,000; continuation of rehabilitation electric substations, $70,000; paving Southgate terminal exten., $50,000, at Navy Yard.

†**Va., Norfolk**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., fire fighters schools, Fleet Service Schools. $25,000.

★ †**Va., Norfolk**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave., N.W., Wash. 25, D. C., firehouse, garage, public works bldg., administration bldgs., cafeteria, roads, tracks, and services, $1,465,000 third increment providing 1,000,000 sq. ft covered storage and 10 acres of open paving, Cheatham Annex, $2,750,000, at Naval Supply Depot.

†**Va., Portsmouth**—Norfolk Co. School Bd., Portsmouth, schools at Simonsdale $65,000; school at Alexander Park, $108,600 school at North Norview, $65,000. **FWA.**

†**Va., Quantico**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., heating plant imprvs. Naval Hospital, $150,000.

†**Va., St. Juliens Creek**—Yards & Docks Navy Dpt., 18 St. and Constitution Ave N.W., Wash. 25, D. C., addnl. 150 hp. boiler and conversion boiler at Bunker C to oil firing, Naval Ammunition Depot. $118,000

†**Va., Yorktown**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., repairing screening house for Loading Plant 2, $25,000; automotive storage shed exten., $70,000; Xray bldg., $70,000; wash house in torpex plant, $30,000, at Naval Mine Depot.

†**Wash., Bremerton**—Pub. Housing. Auth. NHA, Skinner Bldg., 5 and Union Sts, Seattle, Zone 1, plans by Naramore, Bain, Brady & Johanson, Smith Tower, 2 and Yesler Sts., Seattle, Zone 4, frame, masonry recreation bldg., at Sinclair Park Housing $50,000. CD 2/9—ENR 2/15.

†**Wash., Keyport**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., exten. Bldg. 37 (garage), Naval Torpedo Station. $60,000.

†**Wash., Manchester**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C, fire fighters school, Naval Station. $25,000.

†**Wash., Pasco**—Pub. Housing Auth., NHA, Skinner Bldg., 5 and Union Sts., Seattle, Zone 1, plans by J. W. Maloney, Larson Bldg., Yakima, 115 temporary family dwelling units, Wash., 45318-N. $285,000.

★ †**Wash., Puget Sound**—Yards & Docks Navy Dpt., 18 St. and Constitution Ave N.W., Wash. 25, D. C., Secondary battery and fire control shop, $2,400,000; converting Bldg. 427 for battery and outside machine shop, $150,000; salvage shop, $425,000; electric, radio and radar shop, $3,400,000, transportation shop exten., $50,000; paving replacement, incl. drainage, $150,000, at Navy Yard.

†**Wash., Seattle**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., transportation shop addn., $120,000; public works shop and office space addn., $380,000, at Naval Station.

†**Wash., Seattle**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., gymnasium and training tank, $223,000; auditorium, $194,000, at Naval Hospital.

★ †**Wash., Spokane**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., architectural and engineering services by Whitehouse & Price, Hutton Bldg., bldg., Naval Supply Depot.

†**Wash., Vancouver** — Federal Works Agency, Spalding Bldg., Portland, Ore., bids soon repairs, remodeling 3 schools. D J. Stewart, Central Bldg., archt.

★ **Wash., Yakima**—Yakima Valley Memorial Hospital Assn., Holtzinger Bldg., plans by Perry W. Swern & Associates, 19 S. LaSalle St., Chicago, Ill., 9 story, bsmnt. rein.-con. hospital. $750,000. CD 12/19—ENR 12/21.

†**Wis., Milwaukee**—Pub. Housing Auth. NHA, 201 N. Wells St., Chicago 6, Ill., 50 family dwelling units, Wis. 47096; 50 family dwelling units, Wis. 47097.

†**Alaska, Anchorage**—Pub. Housing Auth. NHA, Skinner Bldg., Fifth Ave., Union St. Seattle 1, Wash., 30 family dwelling units Alaska 50084.

†**Alaska, Juneau**—Pub. Housing Auth. NHA, Skinner Bldg., Fifth Ave., Union St. Seattle 1, Wash., 30 family dwelling units Alaska 50083.

†**Alaska, Fairbanks**—Pub. Housing Auth. NHA, Skinner Bldg., Fifth Ave., Union St. Seattle 1, Wash., 30 family dwelling units Alaska 50082.

★ **Ont., Toronto**—Municipality, 1,000 dwellings, $3,500,000. Toronto Housing Comn. Toronto, archts.

★ **Ont., Toronto**—Province of Ontario, plans by Dpt. P. Wks., Toronto, 2 new wings on east block of Legislative Bldg. Over $750,000.

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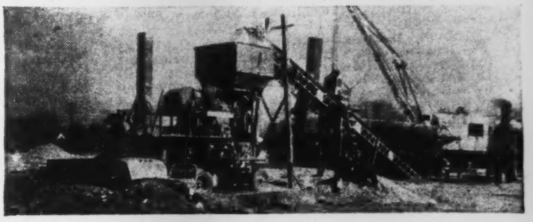

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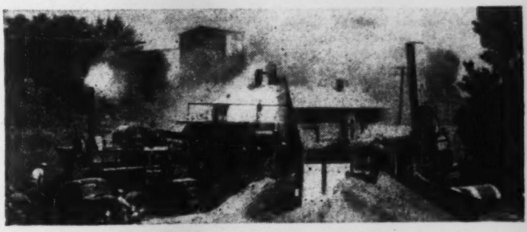

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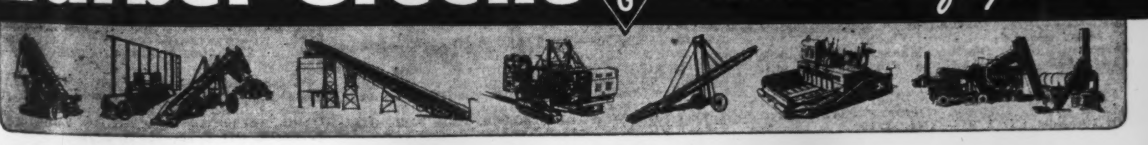

BIDS ASKED

Bids Asked After March 31

★†**Tex., Fort Sam Houston—U. S. Eng.**, Fort Sam Houston, administration clinical and processing bldg. for Brooke Convalescent Hospital, incl. addns., remodeling 28 mobilization type bldgs., etc., Ser. No. 41-154-45-108. CD 3/26—ENR 3/29.

Bids Asked April 10

†**Mich., Ypsilanti—Pub. Bldgs. Admin.**, 18 and F Sts. N.W., Wash. 25, D. C., recreation bldgs., Mich. 20-377. **FWA.** CD 2/21—ENR 3/1.

†**N. C., Swannanoa**—U. S. Eng., Post Office Bldg., Savannah, Ga., library bldg., Type LIB-C-H, at Moore General Hospital.

†**Va., Arlington**—Pub. Bldgs., Admin., 18 and F Sts. N.W., Wash. 25, D. C., exten. fire mains, etc., at Federal Office Bldg. 2.

Bids Asked April 11

†**Ga., Columbus**—Housing Auth. of City of Columbus, Columbus, central office bldg. group, Housing Ga. 4-45.

Bids Asked April 12

†**Ark., Camden—Federal Works Agency**, 550 Post Office Bldg., Dallas, Tex., addnl. post office bldg., etc., $150,000. I. D. Porter, 550 Post Office Bldg., Dallas, Tex., engr.

Bids Asked April 13

†**Calif., Berkeley**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 56 temporary dwelling units, Calif. 4034-N. Williams, Koue and Kirby, 428 13 St., Oakland, archts. CD 3/21—ENR 3/29.

Bids Asked April 14

†**Calif., Port Chicago**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 216 temporary family dwelling units, Calif. 4020-N. Anshen, Reynolds, Chamberlain & Narbett, 5365 Bway., Oakland, archts. CD 3/20—ENR 3/22.

Bids Asked After April 15

★†**N. J., Newark**—Newark Housing Auth., 57 Sussex Ave., 275 family dwelling units, N. J. 2-9, for NHA. $1,500,000. W. E. Lehman, 972 Broad St., archt. CD 1/15—ENR 1/18.

Bids Asked April 16

†**Ga., Dublin**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., (selected bidders) 400-bed expan., 6 ward bldgs. with connecting corridors, cold storage bldg., animal house, Spec. 16008.

Bids Asked April 17

N. Y., New York—New York City Housing Auth., 122 E. 42 St., New York, Zone 17, test borings for Alfred E. Smith Houses.

Bids Asked April 18

†**Calif., San Bruno**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 152 temporary family dwelling units, Calif. 4033-N. L. J. Sharps, E. R. MacDonald & A. C. Williams, 760 Market St., San Francisco, archts. CD 3/14—ENR 3/22.

★**N. S., Halifax**—Secretary Dpt. P. Wks., Ottawa, Ont. Ross Millar Memorial Infirmary and Power House at Camp Hill Hospital. $2,300,000. C. D. Sutherland, c/o owner, archt. CD 3/30.

Bids Asked April 19

†**Calif., Vallejo** — Pub. Housing Auth., NHA, 760 Market St., San Francisco, 92 temporary family dwelling units, Calif. 4999-N. A. Roller, 1 Montgomery St., San Francisco, archt. CD 3/21—ENR 3/29.

Bids Asked April 20

Pa., Tarentum—Boro, H. H. Cirt, secy., Boro Bldg., power plant alterations at boro water and light plant, Contr. 1, disposal turbo-generator and equip., Contr. 2, constructing pit and fdns. for 1,500 kw. turbo-generator and condensor, fdns. for 50 kw. dual driven exciter set, altering bldg. and appurtenant work. Morris Knowles, Park Bldg., Pittsburgh, engr.

Bids Asked About April 23

†**Calif., San Diego**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., Paradise Hills School, Calif. 4-650-F. S. W. Hamil, 1123 Bank of America Bldg., archt. CD 10/19—ENR 10/26.

Bids Asked April 24

†**Wash., Kennewick**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., 50-bed hospital, Wash. 45-299. **FWA.**

B. C., Esquimalt—Secy. Dpt. Munitions & Supply, Ottawa, Ont., High Speed Engine Shop and Workshop Bldg. 51, at H.M.C. Dockyard.

N. B., St. John—Dpt. Natl. Defense, Ottawa, Ont. Army Supply Depot. Over $100,000.

†**Wash., Kennewick**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., 1 story, 242x430 ft., frame hospital, Wash. 45-299-N. $350,000. **FWA.** Naramore, Bain, Brady & Johanson, Smith Tower, 2 and Yesler Sts., Seattle, Zone 4, archts. CD 3/12—ENR 3/15.

Bids Asked

★†**La., McCoy**—Cabot Carbon Co., 77 Franklin St., Boston, Mass., carbon black plant. $1,040,000. Defense Plant Corp. will finance.

†**Tex., Hardin**—Roxboro Steel Co., Hardin, carbon plant, $350,000. Defense Plant Corp. will finance. CD 3/27—ENR 3/29.

★†**Tex., Odessa—United Carbon Black Co., Inc., United Carbon Bldg.**, Charlestown, W. Va., carbon plant expan. $1,423,000. Defense Plant Corp. will finance.

★†**Tex., Seagraves—Columbian Carbon Co., 41 E. 42 St., New York, N. Y.**, carbon black plant. $1,500,000. Defense Plant Corp. will finance.

LOW BIDDERS

†**Ga., East Point—Reconstruction Finance Corp.**, Healy Bldg., Atlanta, warehouse, from Fennell Constr. Co., Gainesville, Base A, **$149,444**; from Tri-State Constr. Co., 114 Ellis St. N.E., Atlanta, Base B, **$37,475.**

†**Kan., Junction City—Pub. Housing Auth.**, NHA, 1411 Electric Bldg., 7 and Lamar Sts., Fort Worth 2, Tex., 90 family housing units, Kan. 14149, from Mont. J. Green Co., Manhattan, **$232,000.** CD 2/27—ENR 3/1.

†**Mass., Bedford**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., addnl. concrete, brick, stone bldgs., utilities at Veterans Hospital, from Jefferson Constr. Co., 52 Washington Ave., Chelsea, **$453,672.** CD 2/23—ENR 3/1.

★†**N. J., Fort Dix (br. Trenton)**—U. S. Eng., Penn-Mutual Bldg., 6 and Walnut Sts., Phila., Pa., Mar. 27, reception center and 6 cafeteria mess hall bldgs., from Andrew Christensen & Son, 1140 E. Jersey St., Elizabeth, **$535,521.**

†**N. C., Charlotte**—Reconstruction Finance Corp., Wilson Bldg., Mar. 29, storage warehouse and railroad siding, from Southeastern Constr. Co., 218 W. 2 St., Charlotte, **$57,577.** K. Franzheim—A. B. Mills, 728-17 St. N.W., Wash., D. C., archts. CD 3/21—ENR 3/29.

★**Okla., McAlester**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., Mar. 27, Ordnance plant addn., NOY 11084, from J. A. Terteling, Box 142-8, Boise, Idaho, est. **$7,300,430.** De Leuw Cather & Co., 20 N. Wacker Dr., Chicago, Ill., engrs. CD 3/15.

†**Wash., Anacortes**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union Sts., Seattle, Zone 1, Mar. 27, 65 housing units in 2 story frame bldg., Whidby Island, Proj. Wash. 45314-N, from S. S. Mullen, 621 9 Ave. N., Seattle, Zone 9, **$175,523.** CD 3/20.

†**Wash., Seattle** — Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union Sts., Zone 1, Mar. 28, 100 housing units in 2 story frame bldg., in Magnolia Bluff Dist., Wash. 45316-N. from Nettleton & Baldwin, 1109 N. 36 St., Zone 3, **$324,000.** Est. $280,000. CD 3/20.

CONTRACTS AWARDED

†**Ala., Montgomery**—U. S. Eng., Grant St. west of Westwood St., Mobile, repairing warehouse and storage bldgs., and reconsignment and holding depot, to Butler & Cobbs, 710 Bell Bldg. Est. **$387,500.**

★†**Ala., Tuscaloosa**—U. S. Eng.,Grant St., west of Westwood St., Mobile, occupational therapy bldg. addn. at Northington General Hospital, Inv. 01-076-45-251, to Ralph A. Smallman Constr. Co., 1109—5 Ave. S., Birmingham, **$505,320.** Bids 3/21.

★†**Ark., Pine Bluff**—U. S. Eng., 300 Bway., Little Rock, fiber container production plant, to Ditmars-Dickmann Constr. Co., 804 Barnes Bldg., Muskogee, Okla., approx. **$1,200,000.** CD 3/7—ENR 3/15.

★†**Calif., Campo**—U. S. Eng., 751 S. Figueroa St., Los Angeles, remodeling office, messes, housing, post exchange, service club, library, recreation hall, roller skating rink, bowling alleys, landscaping at Mitchell Hospital, to Del E. Webb, 406 S. Spring St., Los Angeles. **$600,000.** CD 1/34—ENR 2/8.

†**Calif., Van Nuys**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, addnl. bldg. for WAC at Birmingham General Hospital, to Zoss Constr. Co., 1019 Cole Ave., Los Angeles, **$83,073.**

†**Fla., Pensacola**—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta 3, Ga., 200 family units, Proj. 8219, to A. Blair, First National Bank Bldg., Montgomery, Ala., **$33,761.** CD 2/13—ENR 2/15.

Ind., Portland—Bd. P. Wks., City Hall, power plant imprvs., boiler, to Wicks Boiler Co., Saginaw, Mich., **$46,780*****turbo-generator and condenser, to Allis Chalmers Co., Merchants Bank Bldg., Indianapolis, **$155,856*****cooling tower, to The Marley Co., 1903 Carew Tower, Cincinnati, O., **$31,483.** Grand total **$234,119.** Bids 3/19. CD 3/7.

★†**Ia., Bettendorf**—U. S. Eng., 1709 Jackson St., Omaha, Neb., expan. foundry bldgs., occupied by Ordnance Steel Foundry Co., to Fegles Constr. Co., 711 Wesley Temple Bldg., Minneapolis, Minn. Est. **$1,000,000** total with equip. **$2,500,000.** Giffels & Vallet, Inc., 1,000 Marquette Bldg., Detroit, Mich., engrs. and archts.

†**Kan., DeSoto**—U. S. Eng., 10 E. 17 St., Kansas City, Mo., cooling towers at Sunflower Ordnance plant, to Rentler-Garmer Constr. Co., Box 331, **Kearney, Neb. $92,000.**

★†**Mass., Camp Edwards**—U. S. Eng., 31 St. James St., Boston, convalescent hospital, to C. J. Maney Co., Inc., 24 Dane St., Somerville, **$1,449,977.** CD 3/19—ENR 3/22, under CA.

Minn., Austin—City Bd. Water, Electric, Gas & Power Comrs., W. D. Dunlap, secy., municipal power plant imprvs., 60x90 ft. bldg., and 26x38x60 ft. pump room and installing ventilating equip., rolling doors, etc., to Fuel Economy Engrg. Co., 510 New York Bldg., St. Paul, **$285,000.** Bids 3/21. CD 3/6—ENR 3/8.

★†**Miss., Flora**—U. S. Eng., Grant St of Westwood St., Mobile, Ala., add bldg. at Mississippi Ordnance Plant, to M. Reed Constr. Co., Belzoni. **$1,000,000.** 3/5—ENR 3/8.

Mo., St. Louis—Federal Reserve Bank St. Louis, Bway. and Locust St., Zone altering 5 story, 78x103 ft., concrete bldg., 408-10 St. Charles St., walling southern portion tunnelway under St. Char St., demolition covered walks over St. Char St., etc., to Fruin-Colnon Contg. Co., Merchants-Laclede Bldg., 408 Olive St., Zo 2, **$150,000.** W. J. Knight & Co., Wainwri Bldg., 7 and Chestnut Sts., Zone 1, engrs.

††**Pa., Butler**—U. S. Eng., 925 New Fe eral Bldg., Pittsburgh, 3, 2 and 1 stor brick, frame bldgs., general remodeli for hospital wards, to F. Hoffman Co., Wood St., Wilkinsburg. Est. **$200,000.**

★†**Va., Fort Belvoir**—U. S. Eng., 1 a Douglas Sts. N.W., Wash. 25, D. C., mot shops, etc., to Harwood-Nebel Constr. C 1520 K St. N.W., Wash., D. C., **$893,005.** 3/26—ENR 3/29, under LB.

★†**Wash., Seattle**—Yards & Docks, Na Dpt., 18 St. and Constitution Ave. N.W Wash. 25, D. C., dependents hospital un etc. at Naval Hospital, to Nelse Mortensen Co., 1021 Westlake Ave. N., Zone 9, **$638,05** Bids 3/21. CD 3/27, under LB.

★**B. C., Vancouver**—Dpt. P. Wks., Ottaw Ont., chest unit at Shaughnessy Ho pital, to Smith Brothers & Wilson, Ltd 1267 Richards St., **$570,000.** C. D. Suthe land, c/o owner, archt. CD 1/9—ENR 1/1

★**Ont., Toronto**—Bd. Governors, Quee Elizabeth Hospital, 120 Dunn Ave., story, bsmnt., 42 x 240 ft., rein.-con., bric steel hospital addn., to Jackson-Lewis Co Ltd., 80 King St. W., about **$600,000.** C 2/15—ENR 2/22.

COMMERCIAL BUILDINGS

PROPOSED WORK

Mich., Holland—Society for Christian Edu cation, Holland, plans by J. K. Haveman Holland, 2 story, 80x238 ft., brick, steel concrete school. $150,000.

N. J. Nutley and Clifton—International Telegraph Development Co., River Rd., Clifton, cafeteria converted from present bldg., incl. addn., alterations. $220,000.

N. C., Asheboro—Randolph Hospital, Inc., Court House, bids soon 3 story bsmnt. hospital addn. and 2 story, bsmnt. nurses home. Plans deposit $30, general construction and $25 plumbing and heating from archt. E. G. Flannaghan, Henderson, archt.

Que., Dolbeau—LaFebrique de la Paroisse de Dolbeau, plans by L. Desgagne, 100 Cartier St., Chicoutimi, church and presbytery. About $200,000.

Que., Drummondville—School Comn. of Drummondville, 140 Heriot St., plans by L. N. Audet, 52 Prospect St., Sherbrooke, school, St. Georges St. $175,000.

Que., Joliette—School Comn. of Joliette, R. Tellier, pres., Z. Michand, secy., plans by A. Gravel, 513 Rackel St. E., Montreal, 75x 100 ft., brick, rein.-con. and slab school and teachers residence, Notre Dame St. $250,000. Brouillet & Carmel, 3440 Shuttér St., Montreal, engrs.

★**Que., Joliette**—Sisters of La Providence, 1431 Fullum St., Montreal, plans by A. Martineau, 372 Picadilly Ave., Ottawa, Ont. and 64 Place Bourget, Joliette, 4 story, 50x 225 ft., rein.-con. slab hospital, Blvd. Manseau and rue Lajoie. $700,000. Archambault & Roy, 6278 1 Ave., Rosemont, engrs.

Que., Montreal—Sailors Institute, Place Royale, plans Seamen's Institute and Hotel. $350,000.

Que., Montreal—Societe de Construction de Normanville, De Normanville St., housing program for 1945, $150,000.

Que., Sorel—School Comn. of Sorel, A. O. Cartier, secy., City Hall, plans completed by R. Charbonneau, 5149 Decarie Blvd., Montreal, Notre Dame school and teachers residence, 2 story, bsmnt., rein.-con., brick, Adelaide and Prince Sts. $190,000.

★**Que., Three Rivers**—Cooke Sanatorium, Ste. Marquerite St., plans by E. Denoncourt, 1425 Notre Dame St., sanatorium addn. $800,000.

CONTRACTS AWARDED

Ill., Litchfield—Owner, c/o Contractor, hotel, to V. Dearduff, Litchfield. Est. $200,000.

Ga., Savannah—F. Weis, 702 E. 50 St., 1 story, balcony, 90x157 ft. theatre, to Span-Worrell Co., Stiles Ave., $200,000. Tucker & Howell, Rhodes-Haverty Bldg., Atlanta, archts.

N. C., Winston-Salem—North Carolina Baptist Hospital, Winston-Salem, out-patient bldg., to Fowler-Jones Constr. Co., Winston-Salem. **$159,000.** Bids 3/20. CD 2/21—ENR 3/1.

Wash., Seattle—Crawford & Conover, 6800 48 Ave. N.E., Zone 5, forty-three 2 story, frame houses in Wedgewood addn., to A. Balch, 6800 48 Ave. N.E., Zone 5, Est. **$279,500.** CD 3/15—ENR 3/22.

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INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., Emeryville—PLANT—Oliver Tire & Rubber Co., 4343 San Pablo St., plans by I. M. Johnson, 449 MacArthur Blvd., W. Oakland, brick, steel plant addn. $400,000. G. E. Atkins, Hobart Bldg., San Francisco, engr.

Conn., New Haven—LABORATORY—Bradley Laboratories, Inc., 82 Meadow St., making plans experimental laboratory, alterations, imprvs., Olive St. L. F. Caproni, 1221 Chapel St., engr.

Ill., Chicago—CONVEYOR—Armour & Co., U. S. Yards, plans completed, 5 story, brick conveyor bldg. $200,000. O. A. Anderson, c/o owner, engr.

★ **Ill., Havana**—TURBO-GENERATOR UNITS—Illinois Power Co., Monticello, erecting two 40,000 kw. turbo-generator units on site of former Riverside Park, on east bank of Illinois River 3 mi. south of here. $11,000,000.

Ill., Ottawa—PLANT—Inland Rubber Co., 33 S. Clark St., Chicago, group brick, steel, concrete bldgs. for tire and tube mfg. plant. Approx. $250,000. Giffels & Vallet, 1000 Marquette Bldg., Detroit, Mich., engrs.

Ind., Kokomo—ICE PLANT—J. M. Leach Corp., Buckeye St. at river, rebuilding large portion ice plant. $50,000 or more incl. equip.

La., Tangipahoa—DAIRY—Cloverland Dairy Co., 3400 S. Carrolton Ave., New Orleans, plans by Wm. R. Bush, 504 Pan-American Bldg., New Orleans, 16 x 36 ft., masonry, glass block dairy plant.

Mich., Chelsea—PLANT—Federal Screw Wks., Chelsea, plans by Harley, Ellington & Day, 1507 Stroh Bldg., Detroit, 1 story brick, steel, rein.-con. plant. $50,000. CD 11/16—ENR 11/23.

N. J., Ridgefield—STORAGE—Lowe Paper Co., River Rd., soon lets contract, 1 story, 100x100 ft., tile, steel storage bldg., and concrete passageway connecting new bldg. with existing bldg. $50,000. CD 12/1—ENR 12/7.

N. J., Newfield—PLANT—Specialty Glass Co., Newfield, rebuilding mfg. plant. $150,000.

N. Y., Astoria—FACTORY, etc.—Optical Products Co., Inc., 43 W. 16 St., New York, plans by A. H. Eccles, 29-27 41 Ave., Long Island City, 1 story, 99x100 ft. factory and office bldg., 30 St. $125,000.

N. Y., Long Island City—STORAGE—West Disinfecting Co., 42-16 West St., bids soon, storage bldg., West St., near Jackson Ave. $75,000.

★ **N. Y., New York**—PLANT—Dairymen's League Coop. Assoc., 11 W. 42 St., Zone 18, soon lets contract milk plant, factory, garage, repair shop, 12 Ave. between W. 47 and W. 48 St. $650,000. J. Feld, 103 Park Ave., Zone 17, archts. CD 3/9—ENR 3/15.

N. Y., Watertown—LABORATORY—General Electric Realty Corp., H. H. Newton, in charge, 1 River Rd., Schenectady, sketches laboratory bldg. $150,000. United Engineers & Constructors, Inc., 1401 Arch St., Phila., Pa., engrs.

Ore., Klamath Falls—FUEL HOUSE, etc.—Weyerhaeuser Timber & Sales Co., Longview, Wash., addn. to hog fuel house and conveyor sys. $53,919.

Ore., Pendleton—CANNERY—Pendleton Cannery & Frozen Foods Co., Pendleton, pea cannery. $200,000. Site purchased.

Pa., Ridley Park—FACTORY—Westinghouse Elect. & Mfg. Co., Maloney Bldg., Blvd. of Allies, Pittsburgh, sketches, altering factory. $130,000. L. C. Mechling, Maloney Bldg., Pittsburgh, engr.

Tex., Houston—PLANT—Acme Products Co., Hamilton St. at South St., 1 story, 60 x 120 ft., brick, hollow tile, concrete packing plant. $45,000.

Tex., Nocona—FROZEN FOOD PLANT—Community Frozen Food Project, Nocona, 1 story, brick, concrete frozen food locker plant. $45,000.

Wash., Mount Vernon—WAREHOUSE—C. M. Lux, c/o Chamber of Commerce, 200x400 ft., concrete block warehouse, $200,000.

Wis., Appleton—WAREHOUSE, etc.—Gold Bond Rfg. Co., 918 N. Union St., plans by Le Vee & Allen, 203 E. College Ave., 1 story, bsmnt., 103 x 243 ft., brick, steel warehouse, office.

Wis., Appleton—WAREHOUSE, etc.—Krambo Foods, Inc., 607 S. Main St., Oshkosh, plans by Le Vee & Allen, 203 E. College Ave., 1 story, 253 x 396 ft., 2nd story, 76 x 200 ft., part bsmnt., rein. con., brick warehouse and office bldg.

Man., Sherridon—PLANT IMPROVEMENTS, etc.—Sherritt Gordon Mines Ltd., 25 W. King St., Toronto, Ont., imprv., reconditioning plant and equip., addnl. development. $77,500.

N. H., Londonderry—PLANT—W. P. Mack, Mammoth Rd., Belmont, Mass., completing plans by E. V. Aldrich, 46 Lincoln St., Hudson, Mass., 75 x 105 ft., frame, brick cold storage plant.

N. B., Saint John—GARA —N. B. Pow Co., Saint John, garage. $ 000.

★ **Ont., Aylmer**—PLANT—Imperial Tobac Co. of Canada, Ltd., 381 St. Antoine St Montreal, Que., tobacco processing plan John St. $1,500,000. N. C. Cameron, c/ owner, engr.

Ont., Empire—SHAFT SINKING, etc.—Northern Empire Mines Co., Ltd., Empire shaft sinking and other developmen $70,000.

Ont., Essex—PLANT—Stokely-Van Cam of Canada, Ltd., Essex, plant addn. $83,32

★ **Ont., Falconbridge**—PLANT—Falcon bridge Nickel Ltd., 25 W. King St., To ronto, imprv., reconditioning plant an equip., addnl. development. $902,000.

Ont., Fort Erie—RAILWAY STATION—New York Central System, S. E. Armstrong engr. M. W., 466 Lexington Ave., New York 17, N. Y., new railway station. $100,000 CD 7/13—ENR 7/27.

Ont., Hamilton—PLANT—Dolomite Re fractories, Ltd., c/o H. W. Jackson, 162 Cedar St., Montreal, Que., plant addn. $50,000.

Ont., Hamilton—PLANT—Hamilton Briquets Ltd., Hamilton, coke and coal products mfg. plant. $40,000.

Ont., Hamilton—PLANT—Lustro Beauty Supply Co., Ltd., c/o A. C. Zimmerman, K. C., Hamilton, rouge, tonic and cream mfg. plant.

Ont., Hamilton—PLANT—Peller Brewing Co., Ltd., c/o E. V. Breckow, Port Nelson, brewing and malster plant. $100,000.

Ont., Hamilton—WAREHOUSE—Steel Company of Canada, Ltd., Wilcox St., plans by Hutton & Souter, 26 St. James St., 116 x 275 ft. tin mill warehouse.

Ont., Ilford—DIAMOND DRILLING—Longman Lake Gold Mines, Ltd., c/o Davidson & Co., Ltd., 80 W. King St., Toronto, 20,000 ft. diamond drilling, Patricia Dist. of Northern Ontario, camps, surface work. $90,000. M. G. Smerchanski, c/o owner, engr.

Ont., Iroquois—PLANT—Caldwell Linen Mills, Ltd., H. Caldwell, mgr., Iroquois, soon lets contract, 1 story, 20x95 ft., rein.-con. plant bldg. C. J. Burritt, 644 Rideau St., Ottawa, and E. A. Gardner, 93 Ruskin St., Ottawa, archts.

Que., Joliette—TOBACCO PROCESSING PLANT—La Co-operative des Tobasc Laurentiens, 295 Chaplain St., tobacco processing plant. $250,000.

Ont., Long Branch (Postal Dist. Toronto)—PLANT—James Weir Co. Ltd., Long Branch, paint, enamel, and lacquers, etc. mfg. plant. $50,000.

Ont., Midland—PLANT—Industrial Coatings Ltd., Midland, mastic and plastic floor covering, etc. mfg. plant. $40,000.

Ont., Moosonee—MILL—Gulf Lead Mines Ltd., Moosonee, mill. $75,000.

Ont., Newcastle—PLANT—Durham Growers Cooperative Storage, Ltd., Newcastle, processing plant and cold storage. $50,000.

Ont., Norwich—PLANT—Canada Vinegar Co., Norwich, plant addn., installing addnl. equip. $40,000.

Ont., Oakville—PLANT—Doall Products of Canada Ltd., Oakville, tools, parts, attachments, etc. mfg. plant. $40,000.

Ont., Oakville—FLOUR MILL—North Western Milling Co. Ltd., c/o Wm. H. Lind Oakville, flour mill. $40,000.

Ont., Porcupine—DIAMOND DRILLING—New Augarita Porcupine Mines, Ltd., 10 Adelaide St. E., Toronto, diamond drilling $70,000.

Ont., Prescott—PLANT—Guardian Leather Products, Ltd., 7 King St., laminated chamois and cotton goods mfg. plant $40,000.

Ont., Sarnia—SERVICE STATION, etc.—Owner, c/o N. B. Forbes, archt., 197 N. Christina St., service station, garage and repair shop. $40,000.

Ont., South Porcupine—PLANT IMPROVEMENTS, etc.—Preston East Dome Mines Ltd., 200 Bay St., Toronto, imprvs., reconditioning plant and equip. $375,000.

Ont., Stamford (P. O. Niagara Falls)—PLANT—Niagara Frosted Lockers Ltd., Stamford, cold storage plant. $40,000.

Ont., Sudbury—PLANT—Owner, c/o L. N. Fabbro, archt., 5 Wood Rd., frozen food and storage plant. $75,000.

Ont., Timmins—DIAMOND DRILLING, etc.—Lexindin Gold Mines, c/o Moneta Porcupine Ltd., 62 Yonge St., Toronto, diamond drilling and exploration work. $125,000.

Ont., Toronto—PLANT—Diadem Plastics, Ltd., c/o S. Cohen, K. C., 465 Bay St., mfg. plant. $40,000.

Ont., Toronto—PLANT—Elcraft Co. Ltd., c/o B. Luxenberg, 100 W. Adelaide St., mfg. plant. $50,000.

Ont., Toronto—FACTORY—Gelatin Products, Ltd., 258 Chilver Rd., Windsor, plans by Mathers & Haldenby, 96 Bloor St. W., factory. About $45,000. CD 12/8—ENR 12/14.

Ont., Toronto—FACTORY—J. A. and W. B. Musgrave, 157 Ennerdale Rd., factory. $45,000.

Ont., Toronto—PLANT—Maxwell Paper Box Co., Inc., 170 Berkeley St., 1 story, 80x175 ft., brick, plant, concrete fdn. $60,000.

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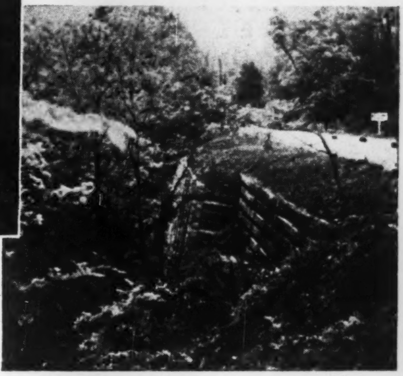

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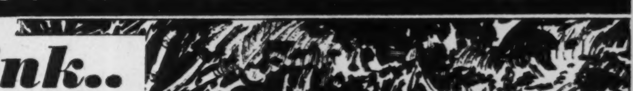

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INDUSTRIAL BLDGS. (Cont'd.)

BIDS ASKED

Bids Asked April 9

R. I., Cranston—FACTORY—Atlantic Tubing & Rubber Co., Mill St., factory alterations, imprvs., incl. steam and waterlines and electric works for motors and sub-station. $60,000. CD 3/26—ENR 3/29.

Bids Asked About April 15

Vt., Montpelier—PLANT—Montpelier Co-Operative Freezer Locker, Montpelier, 1 story, 40x100 ft. freezer locker plant, Barre St. P. R. Webber, Grow St., Rutland, archt. CD 2/27—ENR 3/1.

Bids Asked About April 20

Ga., Atlanta—PLANT—Southern Dairies, Glen Iris Dr., 2 story, 30x60 ft., stone masonry plant addn., and other plant remodeling. $50,000. Eubank & Caldwell, Inc., Roanoke, Va., archts. CD 3/21—ENR 3/29.

Bids Asked in May

Conn., Wethersfield—PLANT—Charles C. Hart Seed Co., 304 Main St., seed plant, brick, Main St. $50,000. Kane & Fairchild, 49 Pearl St., Hartford, archts.

Bids Asked in Spring

Pa., Lester—TEST CELLS—Westinghouse Elect. & Mfg. Co., Maloney Bldg., Blvd. of Allies, Pittsburgh, rein.-con. test cells for testing motors. $185,000. L. C. Mechling, Maloney Bldg., Pittsburgh, engr.

Bids Late Spring

Que., Cowansville—PLANT—Bruck Silk Mills, Ltd., 7 Depot St., plant addn. $75,000. McDougall & Friedman, 1235 McGill College Ave., Montreal, engrs.

LOW BIDDERS

Calif., Thornton—WAREHOUSE—Thornton Canning Co., Thornton, 1 story, 80x250 ft., rein.-con., hollow tile warehouse, from Shepherd & Green, 309 1st Natl. Bldg., Stockton, **$42,600.** Ohm & Ecklund, 123 N. Eldorado St., Stockton, engr.

N. J., Secaucus—PLANT—Callite Tungsten Mfg. Co., 540 39 St., Union City, 1 story, 50x125 ft., and 1 and 2 story, 50x80 ft. metal salvage bldgs., 1 story, 45x50 ft. boiler house, from John Sarubbi Co., Inc., 415-64 St., West New York, **$106,000.** CD 3/13—ENR 3/15.

Tex., Bay City—PLANT—Gulf Coast Water Co., Bay City, 30,000 bbl. rice drying and storage plant, from W. D. Peck, Cit. State Bank Bldg., Houston, **$130,873.** Central Engineering Co., c/o A. Van Zyverden, ch. engr., Larendon Bldg., 1210 Texas St., Houston, engr.

CONTRACTS AWARDED

Ala., Birmingham—PLANT—Dixie Metal Co., Inc., 1507 11 St. N., Bessemer, shell plant, alterations, addns., own forces. **$50,000.**

Ala., Gadsden—PLANT—Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, O., 1 story, 200x260 ft. rubber sole and heel plant addn., brick, to Rust Engrg. Co., Liberty National Bank Bldg., Birmingham.

Calif., Oakland—FACTORY—Pacific Rubber & Tire Mfg. Co., 4901 E. 12 st., 2 story, 50x175 ft., rein.-con. tire factory addn., heavy machinery fdns., sprinkler sys., to Barrett & Hilp, 918 Harrison St., San Francisco. Est. **$90,000.** Ellison & King, 500 Sansome St., San Francisco, engrs.

Calif., Reedley—WAREHOUSE—California Fruit Exchange, N and 40 Sts., Sacramento, 1 story, masonry fruit warehouse, to Trewhitt-Shields & Fisher, 1501 Pacific Southwest Bldg., Fresno. Est. **$40,000.** H. J. Devine, Cronan Bldg., Sacramento, archt.

Calif., San Francisco—PLANT—F. E. Booth, Inc., 280 Battery St., 1 story, mezzanine fish packing plant, to Austin Co., 618 Grand Ave., Oakland. Est. **$90,000.**

Conn., Norwich—FACTORY—U. S. Finishing Co., Greenville, Norwich, 3 brick factory bldg. alterations, addns., to Associated Construction Co., 195 Thames St., Groton. Est. over **$40,000.** Lockwood Greene Co., 10 Rockefeller Plaza, New York, N. Y., engr. CD 2/20—ENR 3/1.

Conn., Stamford — WAREHOUSE — Maguire Industries, Fairfield Ave., brick, masonry warehouuse, Fairfield Ave. Owner builds. **$40,000.**

Ill., Bloomington—PLANT—Sylvania Electric Products, Inc., Williamsport, Pa., electronic equip. factory, to John Felmley Co., 603 Peoples Bank Bldg. Est. **$250,000.**

★ **Kan., Abilene**—POWER PLANT—Kansas Power & Light Co., 808 Kansas St., Topeka, power plant addn., miscellaneous structures, to Geo. Senne & Co., 510 E. 15 St., Topeka, approx. **$500,000.** Black & Veatch, 4706 Bway., Kansas City, Mo., engrs.

Kan., Wichita—FACTORY—Lamp & Stove Co., Wichita, metal work factory bldg., to Hahner & Foreman Constr. Co., 111 N. Waco St., approx. **$50,000.** L. Schmidt, 1832 E. Second St., archt.

Mass., Beverly—BOILER HOUSE—Metal Hydrides, Inc., 14 Congress St., 42x102 ft., brick, steel boiler house addn., to Bond Bros., 77 Ferry St., Everett. Approx. **$40,000.**

Mich., Wyandotte—PLANT—Pennsylvania Salt Mfg. Co., Wyandotte, salt mfg. plant addn., brick, concrete, to Cunningham, Rudy Co., 2087 W. Grand Blvd., Detroit. Est. **$65,000.**

STRIAL BLDGS. (Contracts Awarded,
t'd.)

Harmarville—LABORATORY—Gulf
rch & Development Co., E. H. Gibson,
constr., Gulf Bldg., Pittsburgh, 1 story,
ft., furnace oil test laboratory, rein.-
steel. $60,000.

Bids Asked

Longview—MACHINE SHOP—Rebus
Tool Wks., Longview, reconstructing
ine shop. $100,000. CD 3/2—ENR 3/8.
St. Louis—CAR REPAIR SERVICE—
sh R.R. Co., J. C. Bousfield, ch. engr.,
Exchange Bldg., St. Louis, Zone 1, 1
40x69 ft. car repair service bldg., in
of 3900 Hall St. separate contracts $40,-
lus with equip.
J., **Millburn**—WAREHOUSE—Rimback
ge Co., 385 Millburn Ave., 3 story, 60x75
storage warehouse to Wm. Blanchard
45 Poinier St., Newark, $60,000. G. S.
ley, 101 Park Ave., New York, N. Y.,
CD 11/31—ENR 11/30.
Niagara Falls—PLANT—Canadian
apo Iron Works, Ltd., 560 Portage St.,
ara Falls, brick, glass block plant exten.,
rete fdn. $75,000. J. Baumann, c/o
r, engr.
J., **New Brunswick**—FACTORY—Wil-
Corp., Codwise Ave., 1 story, 50x150
porcelain factory bldg., addn., brick,
Cassera Co., 59 Hale St., $40,000.
evine, 45 Patterson St., archt.
J., **Nutley**—FACTORY—Schifter Mo-
Corp., 89 Washington Ave., 1 story,
rete block factory, to The Fatzler Co.,
653 S. 15 St., Newark, $45,000. CD
—ENR 3/15.
J., **Trenton**—PRESS SHOP—The Roller
ing Co. of America, Whitehead Rd.,
shop bldg. addn., to J. W. Ferguson,
Market St., Paterson, $50,000. CD 2/26
R 3/1.
J., **Kearny (br. Arlington)**—PLANT—
is-Martin Co., Bellville Turnpike, alter-
plant, incl. driving piles concrete bases
heavy equip., to Mahony-Troast Constr.
657 Main Ave., Passaic, $200,000. Salem
Co., Salem, O., engr.
J. **Passaic**—PRODUCE—Sixty Eight-
nty First St. Corp., 64 1 st., one story,
00 ft. fruit produce bldg. addn., to H.
man Co., 1 Amsterdam Ave., $45,000.
ie & Shulman, 262 Main St., Paterson,
ts.
Y., **Long Island City**—STORAGE, etc.
uld-Mersereau Co., 21-16 44th Rd., 1
, storage and shipping bldg., 44 Drive
23 St., to Sauk Constr. Co., Inc., 29-29
ve. Est. $100,000.
O., **Toledo**—FACTORY—Packard Motor
Car Co., Laskey Rd., general contract, 1
2 story, 79x182 ft. dynamometer test
, and 1 story, 79x125 ft. research labora-
bldg., brick, concrete block, to Christ-
Co., 403 Kalamazoo Plaza, Lansing,
Est. $1,250,000 with equip. CD 3/8—
3/10.
e., **Lexington**—GRAIN ELEVATOR—
row County Grain Growers, Lexington,
0 ft., grain elevator wood crib type, to
tern Builders, The Dalles, $39,700.
e., **McNab Station**—GRAIN ELEVATOR
orrow County Grain Growers, Inc., Lex-
on, 125,000 bu. grain elevator, to Western
ders, Inc., The Dalles, $39,700. Awarded

., **McKeesport**—FACTORY—Firth Ster-
Steel Co., H. R. Huemma, treas., Mc-
sport, 1 story, 40x130 ft. prefabricated
, protected metal siding factory addn.,
ab. bldg., to Blaw-Knox Co., Farmers
k Bldg., Pittsburgh; erection, to F. J.
yl, Inc., 1320 East St., Pittsburgh. Est.
,000 incl. equip.
., **New Kensington**—PLANT—Aluminum
king Utensil Co., c/o Aluminum Co. of
erica, R. O. Keefer, purch. agt., Gulf
., Pittsburgh, altering mfg. plant, dig-
tunnels, approx 6 ft. wide, 8 ft. deep,
to Harrison Const. Co., 1101 Western
, NS Pittsburgh. Est. $75,000. CD 11/22
NR 11/30.

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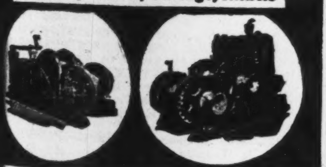

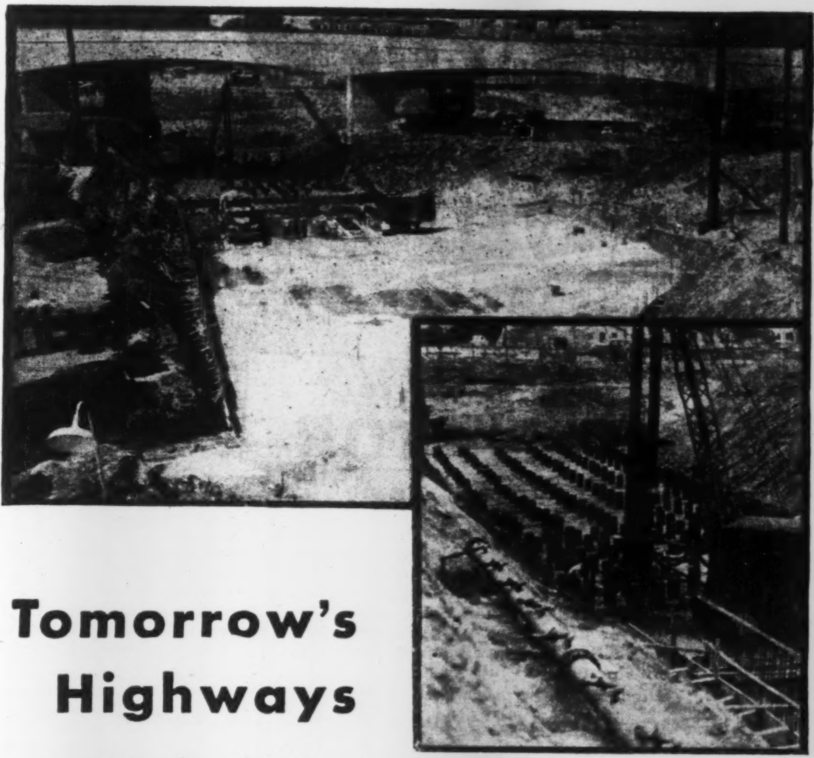

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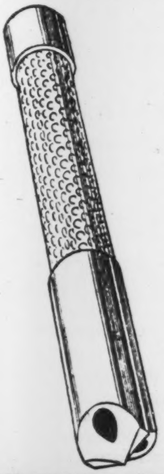
WELLPOINT SYSTEM



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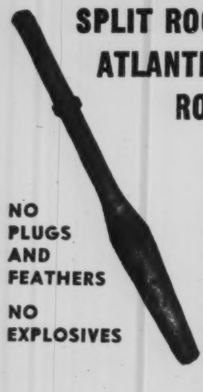

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INDUSTRIAL BLDGS. (Contracts Award
Cont'd.)

Pa., Sharon — PREHEAT FURNACE
Sharon Steel Corp., W. Jackson, gen. wo
mgr., S. Irvin Ave., 32x40 ft. preheat f
nace to preheat 8 to 22 in. slabs, to Elect
Furnace Co., Salem, O. Est. $160,000.
1/31—ENR 2/8.

Tex., McAllen—PLANT—Rado Refini
Co., McAllen, new ethyl lead gasoline pla
to E. B. Darby & Co., Pharr, approx. $60,
CD. 3/23—ENR 3/29.

Tex., San Angelo—REPAIR SHOP, etc.
Westbrook Motor Co., San Angelo, 1 stor
130x130 ft. mechanical repair shop and sto
age, own forces. $50,000. Bids about 2/
Howe & Wise, 610 Stewart Bldg., arch
CD 1/11—ENR 1/15.

Man., Flin Flon—PLANT—Hudson B
Mining & Smelting Co., Ltd., Royal Ba
Bldg., Winnipeg, construct operations, sha
sinking, ore pockets, etc., own forces, $27
100. CD 3/30/44—ENR 4/13/44.

Man., St. Boniface — PLANT — Cana
Packers, Ltd., 2200 St. Clair Ave. W., T
ronto, Ont., plant bldg., and install.
equip., own forces, $176,308.

Ont., Hamilton—PLANT—Hamilton Cott
Co., Ltd., 304 Mary St., 1 story, 180x310 f
brick, stone, structural steel plant exte
to Frid Constr. Co., Ltd., 128 E. King S
Est. $300,000. Prack & Prack, 36 St. Jam
St., archts.

UNCLASSIFIED

PROPOSED WORK

★ **†California**—FLEET LANDING, etc.—
Yards & Docks, Navy Dpt., 18 St. an
Constitution Ave. N.W., Wash. 25, D. C
development facilities to handle fleet pe
sonnel, San Francisco Bay area, incl. fle
landing at Ferry Bldg., San Francisco, an
ferry terminals at Alameda and Hunte
Point. $500,000.

†Calif., Beaumont—TRAINING TANK—
Yards & Docks, Navy Dpt., 18 St. and Co
stitution Ave. N.W., Wash. 25, D. C., trai
ing tank, Naval Convalescent Hospital, $9
000.

†Calif., El Centro—AIR STATION BLDGS
—Yards & Docks, Navy Dpt., 18 St. an
Constitution Ave. N.W., Wash. 25, D. C
recreation bldg., Marine Corps Air Statio
$184,000.

†Calif., El Toro—AIR STATION CHAPE
—Yards & Docks, Navy Dpt., 18 St. and Co
stitution Ave. N.W., Wash. 25, D. C
chapel for 200, Marine Corps Air Statio
$40,000.

†Calif., Eureka—PIERS, etc.—Yards
Docks, Navy Dpt., 18 St. and Constitutio
Ave. N.W., Wash. 25, D. C., piers, service
and dredging, Section Base. $250,000.

†Calif., Fallbrook—FIRE MAINS—Yard
& Docks, Navy Dpt., 18 St. and Constitutio
Ave. N.W., Wash. 25, D. C., fire main altera
tions and addnl. fire protection mains, Nava
Ammunition Depot. $83,000.

★ **†Calif., Hunters Point**—PIERS, etc.—
Yards & Docks, Navy Dpt., 18 St. an
Constitution Ave. N.W., Wash. 25, D. C.,
piers, $6,000,000; drydock, $10,000,000; cran
track exten. to Submarine Drydocks 5, 6 an
7, $112,000; quay wall and 2 repair pier
$5,000,000; South area yard lighting, $140,
000; addnl. fill, $1,769,000, at Naval Dry
docks.

★ **†Calif., Mare Island**—YARD CONVER
SION, etc.—Yards & Docks, Navy Dpt., 1
St. and Constitution Ave. N.W., Wash. 2
D. C., yard rearrangement and conversio
increasing repair output, $1,000,000; relocat
ing access railroad between causeway an
classification yard, $261,000, at Navy Yard

†Calif., Monterey—PIERS, etc.—Yards
Docks, Navy Dpt., 18 St. and Constitutio
Ave. N.W., Wash. 25, D. C., piers, service
and dredging, Section Base. $250,000.

†Calif., Oceanside—TRAINING TANK—
Yards & Docks, Navy Dpt., 18 St. and Co
stitution Ave. N.W., Wash. 25, D. C., train
ing tank, Naval Hospital, $50,000.

†Calif., Pacific Beach — TRAINING
DEVICES—Yards & Docks, Navy Dpt., 1
St. and Constitution Ave. N.W., Wash. 2
D. C., training devices, Antiaircraft Train
ing Center, $50,000.

†Calif., Point Montara — TRAINING
DEVICES—Yards & Docks, Navy Dpt., 1
St. and Constitution Ave. N.W., Wash. 2
D. C., training devices, Antiaircraft Train
ing Center, $50,000.

†Calif., Port Hueneme—FIRE PROTEC
TION, etc.—Yards & Docks, Navy Dpt., 1
St. and Constitution Ave. N.W., Wash. 2
D. C., fire protections and roads, Advanc
Base Depot. $190,000.

Calif., Richmond—SHIPYARD BLDGS.—
H. J. Kaiser Co., Latham Square Bldg., Oak
land, constructing in-plant feeding servic
in Richmond Shipyard 3, consisting enlarg
ing cafeteria and constructing strategicall
located food dispensaries in yard. $250,000

Calif., Salinas—SWIMMING POOL—City
G. Teichert, acting city clk., City Hall, $160,
000 bond election June 6, swimming pool i
Cherwood Park. F. E. Lloyd, 210 Post St.
San Francisco, archt.

†Calif., San Clemente Island—PIERS, etc
—Yards & Docks, Navy Dpt., 18 St. and
Constitution Ave. N.W., Wash. 25, D. C.
pier and roads at Fleet Training Base
$250,000.

CLASSIFIED (Proposed Work, Cont'd.)

Calif., San Diego—PIER, etc.—Yards & cks, Navy Dpt., 18 St. and Constitution e N.W., Wash. 25, D. C., addnl. pier, vices, Frontier Base. $250,000.

Calif., San Diego—TRAINING DEVICES ards & Docks, Navy Dpt., 18 St. and stitution Ave. N.W., Wash. 25, D. C., ning devices, Fleet Service Schools, $50,-

Calif., San Francisco—DRUM STORAGE ards & Docks, Navy Dpt., 18 St. and stitution Ave. N.W., Wash. 25, D. C., nl. druum storage and handling facilities, al Overseas Freight Terminal, $180,000.

Calif., Santa Barbara—AIR STATION APEL—Yards & Docks, Navy Dpt., 18 and Constitution Ave. N.W., Wash. 25, C., chapel for 200, Marine Corps. Air tion, $40,000.

Calif., Santa Barbara — PIERS, etc. — rds & Docks, Navy Dpt., 18 St. and Con- ution Ave. N.W., Wash. 25, D. C., piers, vices and dredging at Naval Maintenance pot. $250,000.

Calif., Santa Monica—RUNWAY—U. S. Eng., 751 S. Figueroa St., Los Angeles, e 14 and City of Santa Monica, postponed s to have been opened Mar. 24, 5,000 ft. way, at Municipal Airport, $995,958. ll readvertise. CD 3/15.

Calif., Shoemaker — TRAINING TANK, —Yards & Docks, Navy Dpt., 18 St. and stitution Ave. N.W., Wash. 25, D. C., ining tank, $180,000; courts and bleachers, ,000, at Naval Hospital.

Calif., Shoemaker — RECREATION EAS—Yards & Docks, Navy Dpt., 18 St. d Constitution Ave. N.W., Wash. 25, D. C., door recreation areas. Naval Training d Distribution Center, $29,000.

Calif., Stockton—TRAGKS, etc.—Yards Docks, Navy Dpt., 18 St. and Constitution e. N.W., Wash. 25, D. C., addnl. develop- nt Naval Material Redistribution Center, l. tracks, grading, roads and open storage ving, Naval Supply Depot Annex, $170,-

Calif., Terminal Island—FLEET LAND- GS—Yards & Docks, Navy Dpt., 18 St. d Constitution Ave. N.W., Wash. 25, C., addnl. fleet landings, Naval Operating se. $200,000.

†Calif., Terminal Island—MOLE, etc.— Yards & Docks, Navy Dpt., 18 St. and nstitution Ave. N.W., Wash. 25, D. C., prv. mole, incl. hydraulic fill, $3,386,000; ttleship graving dock, $7,700,000; tracks, 15,000; paving, $54,000; paving of break- ter mole, $1,000,000; finger piers and harf on breakwater mole, $9,500,000; pier eds on breakwater mole, $1,910,000; rail- ad connections and utilities for break- ter mole, $2,272,000; quay wall replacing marginal wall, $938,000; paint and oil eds, $150,000; rehabilitating underground ectric distr. sys., $400,000, at Naval Dry- cks.

Colorado and Utah — LOADING SLAG — e Denver & Rio Grande Western R. R. Co., E. Perlman, ch. engr., Rio Grande Bldg., nver 1, Colo., loading 44,000 cu. yd. slag Leadville, Colo., and 41,700 cu. yd. at urray, Utah.

Conn., Newington—PLAYGROUND—Town . Selectmen, Town Hall, playground and creation, Elm Hill School, $25,000.

†Conn., New London—PIERS—Yards & ocks, Navy Dpt., 18 St. and Constitution e. N.W., Wash. 25, D. C., strengthening ers 7 and 6, Submarine Base. $45,000.

†D. C., Wash.—STEAM GENERATING FACILITIES—Yards & Docks, Navy Dpt., St. and Constitution Ave. N.W., Wash. D. C., imprv. steam generating facilities, 0,000; electric generating facilities, $300,- ; exten., imprv. street lighting, $50,000, vy Yard.

†Ill., Chicago—AIR CENTER BLDGS., etc. Yards & Docks, Navy Dpt., 18 St. and nstitution Ave. N.W., Wash. 25, D. C., r engine test stands, $40,000; temporary ngar, $38,000; alterations, imprvs. mess- ll and instruction rooms, $26,000, at Naval r Technical Training Center.

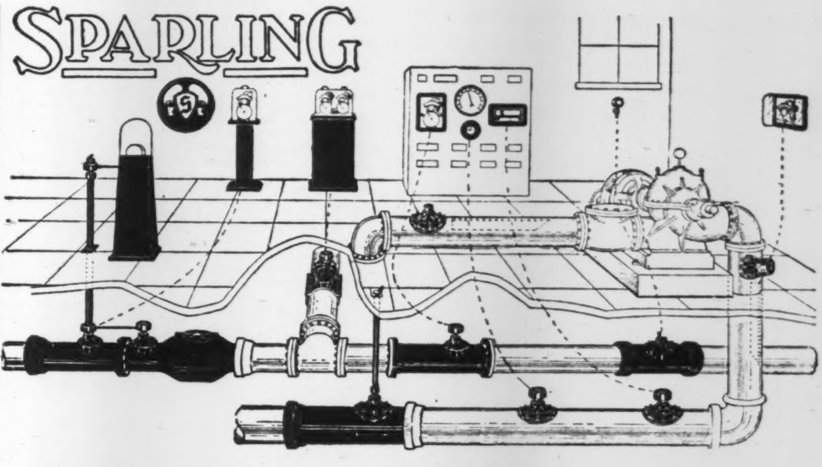
†Ill., Great Lakes—TRAINING DEVICES Yards & Docks, Navy Dpt., 18 St. and nstitution Ave. N.W., Wash. 25, D. C., ining devices, Antiaircraft Training Cen- r, $25,000.

†Ill., Great Lakes—TRAINING DEVICES Yards & Docks, Navy Dpt., 18 St. and Con- tution Ave. N.W., Wash. 25, D. C., new ining devices, Naval Training Station. 00,000.

†Ind., Crane—RAILROAD SPUR, etc.— rds & Docks, Navy Dpt., 18 St. and Con- tution Ave. N.W., Wash. 25, D. C., addnl. ilroad spur, $30,000; connection to Balti- ore & Ohio R.R., $250,000, at Naval Am- unition Depot.

La., Harvey — PLATFORMS, etc. — The uthern Shell Fish Co., Harvey, installing mber platforms on timber pile fdns., single ooring piles and pile clusters within edged area in Harvey Canal subdivision Gulf Intercoastal Waterway, Mississippi ver, Atchafalaya River sections, west bank ntral to point about 675 ft. south of here.

La., Iota — NATURAL GAS SYSTEM — wn, natural gas sys., incl. approx. 7 mi. ains. Barnard & Burk, 314 Triad Bldg., ton Rouge.



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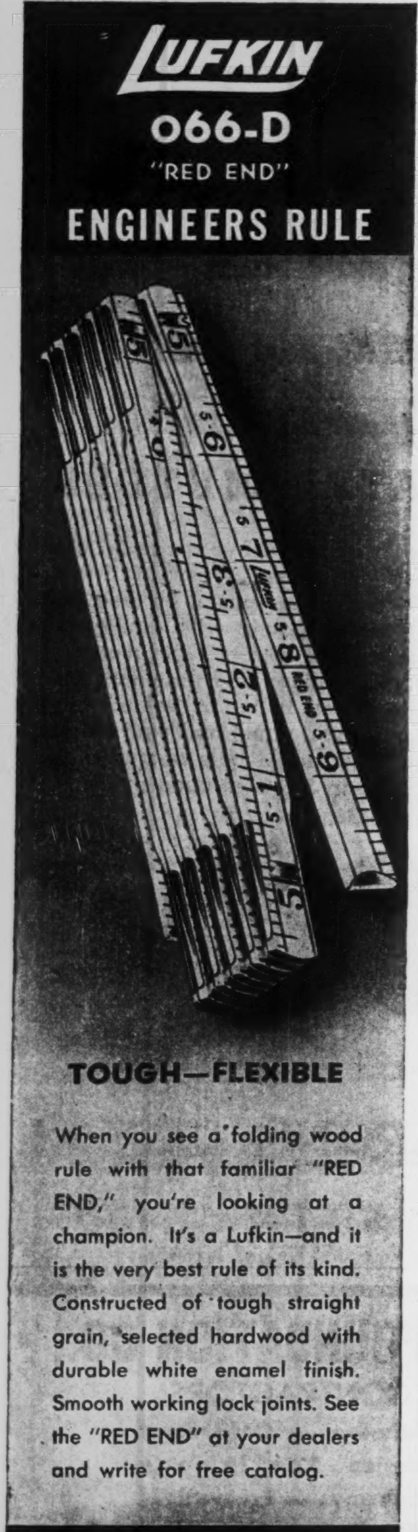

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UNCLASSIFIED (Proposed Work, Cont'd.)

†La., Kenner—RUNWAY—U. S. Eng., 35 St. and Avenue F, Galveston, fixing approach to east-west runway. $20,000.

La., Lake Charles—OIL PIPELINE—Continental Oil Co., Lake Charles, installing 6 in. oil pipeline encased in 8 in. casing, under and across English Bayou, 3.4 mi. above mouth of waterway, approx. 4 mi. northeasterly from here, at Calcasieu Parish.

★**†La., New Orleans**—RAILROAD CLASSIFICATION and STORAGE TRACKS, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., railroad classification and storage tracks, $35,000; stabilization of area adjacent to south mole pier, $75,000; berthing services, south quay wall and mole pier, $400,000; concrete curb and gutters for drainage imprvs. on existing streets, $60,000, at Naval Repair Base.

★**†Me., Brunswick** — AIR STATION BLDGS., etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., aircraft storehouse, $64,000; assembly and repair shop, $385,000; Marine barracks, incl. offices, guard house and quartermaster stores, $93,000; station security, fire protection and perimeter road, $54,000; water treatment plant, $25,000; replacement heating and plumbing fixtures, $106,000, Naval Air Station.

†Me., Portland—LIGHTING FACILITIES, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., lighting facilities for loading and docking at night, $21,000; new deck at Grand Trunk Pier, $80,000; fleet recreation facilities, $25,000, at Naval Station.

†Md., Annapolis—RIFLE RANGE, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., altering rifle range, $64,000; bunker on rifle range, $83,000; replacement duct bank and high-tension cables in Sand Road, $79,000; Bancroft Hall court area structures, $100,000, at United States Naval Academy.

†Md., Port Deposit — BORE RANGE — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., small bore range, Naval Training Station. $200,000.

★**†Mass., Boston**—DRYDOCKS, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., rebuild outer portion Drydock 1, $500,000; Drydock 2, $800,000; rearrangement and conversion of yard to increase repair output, $1,000,000; replacement drydock cranes, $600,000, at Navy Yard.

Mass., Ludlow—PARK—Town, Bd. Selectmen, Town Hall, bids soon park development at recreational center. $25,000.

†Mass., Martha's Vineyard—RUNWAY—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., east-west runway, Naval Auxiliary Air Facility. $216,000.

†Mass., Nantucket Island—TAXIWAY—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. taxiway, Naval Auxiliary Air Facility. $60,000.

†Miss., Gulfport—RAILROAD TRACKAGE REPLACEMENT, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., replacement of and minor extens. to railroad trackage, resurfacing open storage area, Advance Base Depot. $75,000.

†Nev., Hawthorne — UNDERGROUND FIRE ALARM CABLE—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., replacement underground fire alarm cable, Naval Ammunition Depot, $100,000.

★**†N. H., Portsmouth**—TRACKS, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., imprv. tracks and paving $1,100,000; repair, replacement and modification mechanical distr. sys., $500,000; rearrangement and conversion of yard increasing repair output, $700,000, at Navy Yard.

†N. J., Atlantic City—HEAT DISTRIBUTION SYSTEM—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., revision of heat distr. sys., Naval Air Station, $136,000.

★**†N. J., Bayonne**—APPROACH PIER, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., approach pier for graving dock, incl. dredging for rerouting channel at Bayonne Annex. $2,875,000.

†N. J., Cape May—PIER—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., exten. Pier 3, Frontier Base. $250,000.

N. J., Clark (P. O. Linden)—CRANEWAY ENCLOSURE—Hyatt Bearing Div. General Motors Corp., 227 Middlesex St., Harrison, 56x240 ft., brick, steel craneway enclosure.

†N. J., Earle—POWER DISTRIBUTION SYSTEM, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., imprv. power distr. sys., $50,000; seeding, grading to reduce storm damage, $50,000, at Naval Ammunition Depot.

†N. J., Lake Denmark—LIGHTING PROTECTION, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., lighting protection and paving, Naval Ammunition Depot, $20,000.

New Mexico — TRANSMISSION LINES Socoro Electric Cooperative, Socoro, 240 rural electric transmission lines, Socoro $360,000. REA.

†N. M., Roswell—HANGAR, etc.—U Eng., Albuquerque, double hangar, reloc ing several bldgs., paving. $367,114.

†Neb., Sidney—RAILROAD FACILITIES U. S. Eng., 909 17 St., Denver, Colo., ca celled bids to have been opened Mar addnl. railroad facilities for warehouses Sioux Ordnance Depot. Will revise pla and readvertise. CD 3/12—ENR 3/15.

New York—PIPELINE—Republic Lig Heat & Power Co., Jackson Bldg., Buffa addnl. pipeline, compressor facilities, Cha tauqua and Erie Counties.

†N. Y., Brooklyn—TRACK REPAIRS, —Yards & Docks, Navy Dpt., 18 St. a Constitution Ave. N.W., Wash. 25, D. repair track for drydock cranes, $90,0 repairs, reconstruct flume, Drydocks 2 and $100,000, at Navy Yard.

★**†N. Y., Brooklyn** — YARD CONVE SION, etc. — Yards & Docks, Na Dpt., 18 St. and Constitution Ave. N.W Wash. 25, D. C., rearrangement and conve sion yard increasing output, $1,000,0 permanent welding services for Drydocks and 6, $59,000, at Navy Yard.

†N. Y., Lido Beach—TRAINING DEVIC —Yards & Docks, Navy Dpt., 18 St. a Constitution Ave. N.W., Wash. 25, D. training devices, Antiaircraft Training Ce ter, $25,000.

†N. Y., Tompkinsville—FLOATING DR DOCK—Yards & Docks, Navy Dpt., 18 and Constitution Ave. N. W., Wash. 25, D. facilities for floating drydock, at Fronti Base. $150,000.

N. Y., Selkirk—YARD REPAIRS—Ne York Central Sys., S. E. Armstrong, c engr., 466 Lexington Ave. New York, so lets contract repairing freight yards, pavin drainage, etc.

†Okla., Norman—AIR CENTER BLDGS etc.—Yards & Docks, Navy Dpt., 18 St. a Constitution Ave. N.W., Wash. 25, D. interior alterations to instruction bldg $65,000; addnl. aircraft parking area, $6 000; repaving and resurfacing roads a streets, $118,000. Naval Air Technical Trai ing Center.

†Oregon, Washington—TOWERED LOO OUT HOUSES—U. S. Forest Service, 27 N.W. Yeon Ave., Portland, Ore., fram towered lookout houses, at 5 points Oregon forests and one in southern Wash ington. $17,500.

Oregon—HYDRO-ELECTRIC PROJECT California-Oregon Power Co., Yreka, Calif 40,000 kw. hydro-electric project on Nort Umpqua River, Douglas Co., 50 mi. east Roseburg.

†Ore., Astoria—PIERS—Yards & Dock Navy Dpt, 18 St. and Constitution Ave. N.W Wash. 25, D. C., pier alterations, imprv Naval Station. $100,000.

†Pa., Johnsville—AIRFIELD DEVELO MENT—Yards & Docks, Navy Dpt., 18 S and Constitution Ave. N.W., Wash. 25, D. C airfield development, incl. hazard eliminatio surfacing parking apron, constructing ta way and exten. Runways 4, 9, and 22 an turning bulbs, $430,000; transportation bldg $100,000; electric power and lighting facil ties, $36,000; removing columns and install ing trusses, $150,000 at Naval Aircra Modification Unit.

†Pa., Mechanicsburg—AVIATION STOR HOUSE—Yards & Docks, Navy Dpt., 18 S and Constitution Ave. N.W., Wash. 25, D. C aviation ordnance storehouse, Naval Supp Depot. $75,000.

★**†Pa., Phila.** — YARD CONVERSION — Yards & Docks, Navy Dpt., 18 St. an Constitution Ave. N.W., Wash. 25, D. C rearrangement and conversion of yard in creasing repair output, at Navy Yard. $1,000,000.

†R. I., Charlestown—AIR STATION IM PROVEMENTS — Yards & Docks, Nav Dpt., 18 St. and Constitution Ave. N.W Wash. 25, D. C., storm sewerage sys., $92,000; domestic water supply extens., $63,000 fire protection mains, $60,000, at Nava Auxiliary Air Facility.

†R. I., Charlestown—NAVAL AUXILIAR AIR FACILITY SEWERS, etc.—Yards Docks, Navy Dpt., 18 St. and Constitutio Ave. N.W., Wash. 25, D. C., sanitary sewer age sys. extens., and septic tanks, $60,000 surfacing roads and relocating mains en trance roads, $115,000, at Naval Auxiliar Air Facility.

†R. I., Davisville—RAILROAD TRACK AGE REPLACEMENT, etc.—Yards & Dock Navy Dpt., 18 St. and Constitution Ave. N.W. Wash. 25, D. C., replacement of and mino extensions to railroad trackage, resurfacin open storage areas, major repairs to roads renewing deck on pier, Naval Advance Bas Depot. $292,000.

†R. I., Gould Island—DOCK, etc.—Yard & Docks, Navy Dpt., 18 St. and Constitutio Ave. N.W., Wash. 25, D. C., rebuilding sout dock, $30,000; exten. salt water fire lines $22,000, at Naval Torpedo Station.

†R. I., Newport—QUAY WALL—Yards & Docks, Navy Dpt., 18 St. and Constitutio Ave. N.W., Wash. 25, D. C., quay wall, a former Frontier Base, $400,000.

†R. I., Prices Neck—TRAINING DEVICES —Yards & Docks, Navy Dpt., 18 St. an Constitution Ave. N.W., Wash. 25, D. C training devices, Antiaircraft Training Cen ter. $40,000.

NCLASSIFIED (Proposed Work, Cont'd.)

★ †R. I., **Quonset Point**—AIR STATION LIGHTING, etc.—Yards & Docks, Navy pt., 18 St. and Constitution Ave. N.W., ash. 25, D. C., seadrome lighting, $45,000; cinerator addn., $70,000; laundry, $140,000; est house and visitors area, $29,000; as-halt surfacing at 2 outlying fields for rrier landing practice, $1,215,000; modifi-ation of intersections, Runways 5-23 and -34, $497,000; roads, drainage and revet-ents at Hope Island, $75,000, at Naval Air ation.

†S. C., **Charleston**—PIER—Yards & Docks, avy Dpt., 18 St. and Constitution Ave. .W., Wash. 25, D. C., constructing T head main pier, at Frontier Base. $40,000.

★ †S. C., **Charleston**—YARD CONVERSION —Yards & Docks, Navy Dpt., 18 St. and onstitution Ave. N.W., Wash. 25, D. C., arrangement and conversion of yard in-easing output. Navy Yard, $800,000.

†Tenn., **Memphis**—AIR CENTER BLDGS. -Yards & Docks, Navy Dpt., 18 St. and Con-itution Ave. N.W., Wash. 25, D. C., interior lterations to instruction bldgs., $70,000; orage bldgs, $40,000; recreation bldg. addn., 5,000, at Naval Air Technical Training enter.

Texas—RURAL ELECTRIC LINES—Wood ounty Cooperative, Quitman, exten. rural ectric lines, Wood Co. $25,000 REA allot.

†Tex., **Austin**—AIRPORT—U. S. Eng., 25 . and Avenue F, Galveston, turfing, sod-ing, ground work, etc., at Rob. Mueller Air-ort. $16,800.

†Tex., **Corpus Christi**—AIR CENTER BAR-ACKS, etc.—Yards & Docks, Navy Dpt., 18 . and Constitution Ave. N.W., Wash. 25, . C., barracks bldg. and enclosing tank, aval Air Technical Training Center, $140,-0.

Tex., **Denton**—ELECTRICAL SYSTEM, tc.—City, electric sys., distribution lines, ubstation, generator and engine, switch-oard, connections, etc., $478,600. J. E. Ward, arvey-Snider Bldg., and H. C. Saunders, ichita Falls, engrs.

Tex., **Plainview**—AIRPORT—Hale Co., E. ibbets, judge, and city of Plainview, J. N. ordan, mayor, Plainview, preparing plans irport, incl. 2 runways, taxiway, concrete pron, multiple type hangars, administration ldg., etc. $175,000. Bonds voted. W. J. Wil-ams, P. O. Box 1272, Plainview, engr.

★ †Utah, **Clearfield**—FIRE PROTECTION, etc.—Yards & Docks, Navy Dpt., 18 St. nd Constitution Ave. N.W., Wash. 25, D. C., ddnl. fire protection, incl. sprinklers, $500,-0; relocating boundary fence, $30,000, avia-ion ordnance storehouse, $75,000, at Naval upply Depot.

†Va., **Alexandria**—SPRINKLER SYSTEM, tc.—Yards & Docks, Navy Dpt., 18 St. and onstitution Ave. N.W., Wash. 25, D. C., prinkler sys., $50,000; test pit alterations, 0,000, at Naval Torpedo Station.

†Va., **Camp Peary (Williamsburg)**—RAINING DEVICES—Yards & Docks, Navy pt., 18 St. and Constitution Ave. N.W., ash. 25, D. C., training devices, Naval Re-raining Command, $100,000.

†Va., **Dahlgren** — RUNWAYS — Yards & ocks, Navy Dpt., 18 St. and Constitution ve. N.W., Wash. 25, D. C., resurfacing air-raft runways, Naval Proving Ground, 160,000.

†Va., **Dam Neck**—TRAINING DEVICES—ards & Docks, Navy Dpt., 18 St. and Con-itution Ave. N.W., Wash. 25, D. C., train-g devices, Antiaircraft Training Center. 0,000.

†Va., **Little Creek**—FLOATING DOCKS—ards & Docks, Navy Dpt., 18 St. and Con-itution Ave. N.W., Wash. 25, D. C., facili-es for 2 floating docks, at Frontier Base. 160,000.

†Va., **Norfolk**—AVIATION BLDG. IM-ROVEMENTS—Yards & Docks, Navy pt., 18 St. and Constitution Ave. N.W., ash. 25, D. C., Bldg. 132 alterations and prinkler sys. at South Annex, Naval Avia-on Supply Depot. $210,000.

★ †Va., **Norfolk**—DRYDOCK REPAIRS, etc.—Yards & Docks, Navy Dpt., 18 St. d Constitution Ave. N.W., Wash. 25, D. C., pair outer caisson seats of Drydock 4, 00,000; Drydock 3, $35,000; Drydock 1, 5,000; installing adequate yard lighting, 00,000; reconstructing Wharf A, in con-rete, $110,000; Wharf B, $190,000; recon-ructing Richmond Dock, Berth 101, Saint elena, $27,000; berthing space at Saint elena for navy yard floating equip., $38,-0; yard rearrangement and conversion in-easing repair output, $1,000,000, rebuilding rry slip, $50,000, at Navy Yard.

★ †Va., **Norfolk**—RAILWAY, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitu-on Ave. N.W., Wash. 25, D. C., 500 ton arine railway, $200,000; rehabilitation un-erground steam distr. sys., $600,000, re-acing paving and drainage, $100,000; train-g devices, $50,000, at Naval Operating ase.

†Va., **Norfolk**—SCRAP and SALVAGE—ards & Docks, Navy Dpt., 18 St. and Con-itution Ave. N.W., Wash. 25, D. C., scrap d salvage yard, Naval Operating Base. 200,000.

†Va., **Quantico** — ELECTRIC DISTRIBU-ION SYSTEM—Yards & Docks, Navy Dpt., St. and Constitution Ave. N.W., Wash. . D. C., imprv. electric distr. sys., Naval ospital, $73,000.

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Each crusher in the 16 different sizes of Rogers Jaw Crushers manufactured is individually designed and correctly proportioned. Bearing sizes are selected from SKF self-aligning spherical roller bearings two to three sizes larger than normally recommended and used. Shaft diameters are correspondingly oversize, resulting in long life for the bearings and shaft.

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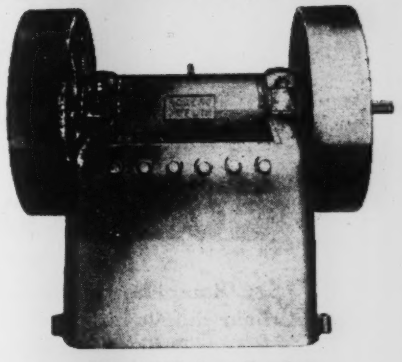
These and other features combine to make Rogers Jaw Crushers sturdy, economical and trouble free reduction units.



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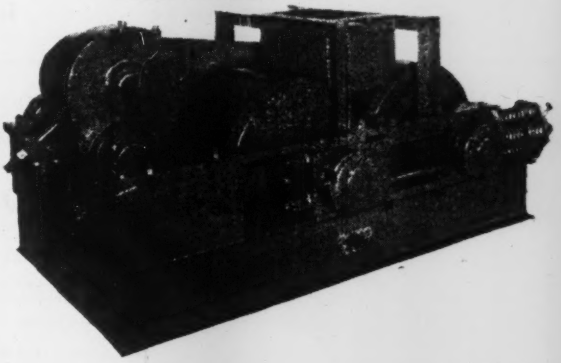

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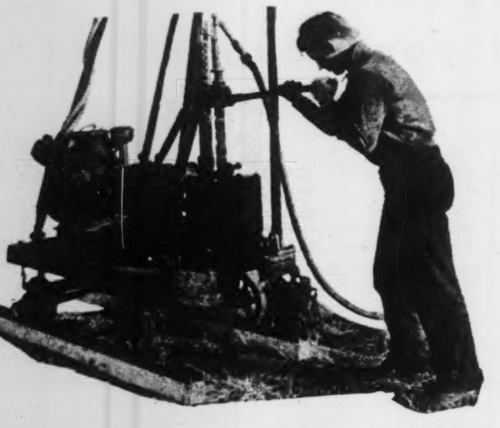

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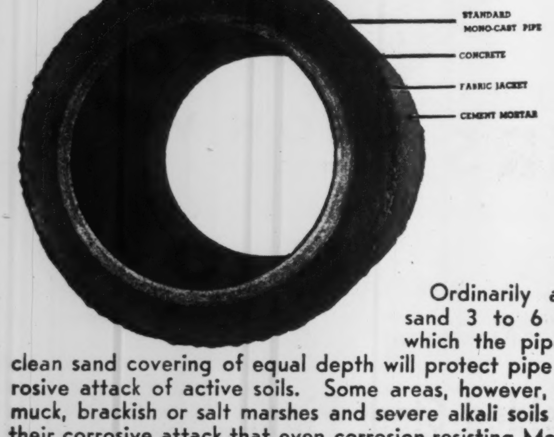


Ordinarily a bed of clean sand 3 to 6 inches deep on which the pipe is laid and a clean sand covering of equal depth will protect pipe against the corrosive attack of active soils. Some areas, however, such as swamps, muck, brackish or salt marshes and severe alkali soils are so vicious in their corrosive attack that even corrosion-resisting Mono-Cast Centrifugal Pipe should be armored to assure permanence. Armored Mono-Cast Pipe will give lasting service in such severe and corrosive areas where the sand or other treatment may not be effective. Further information gladly supplied on request.

AMERICAN CAST IRON PIPE CO., Birmingham 2, Alabama

Sales Offices in Principal Cities

UNCLASSIFIED (Proposed Work, Cont'd)

†Va., Yorktown—RAILROAD TRACK etc.—Yards & Docks, Navy Dpt., 18 S and Constitution Ave. N.W., Wash. 25, D C., addnl. railroad track, $50,000; barricade for railroad cars and trucks, $142,00 classification yard, $40,000, at Naval Mi Depot.

†Wash., Keyport—PIERS, etc.—Yards Docks, Navy Dpt., 18 St. and Constitu tion Ave. N.W., Wash. 25, D. C., exte Pier 1, $165,000, quay wall and lan imprvs., $650,000, at Naval Torpedo Statio

†Wash., Pacific Beach—TRAINING DE VICES—Yards & Docks, Navy Dpt., 18 S and Constitution Ave. N.W., Wash. 25, D C., training devices, Antiaircraft Trainin Center. $50,000.

†Wash., Puget Sound—PIER, etc.—Yard & Docks, Navy Dpt., 18 St. and Consti tution Ave. N.W., Wash. 25, D. C., impr Pier 4 and accessories, $3,250,000; addn crane tracks connecting Drydocks 1, 2 and $300,000; yard rearrangement and conver sion increasing repair output, $1,000,000, Navy Yard.

†Wash., Seattle — APRON — Yards Docks, Navy Dpt., 18 St. and Constitutio Ave. N.W., Wash. 25, D. C., apron for sti leg derrick and rebuilding apron west o Pier 91, Naval Station. $290,000.

†Wash., Seattle—ELECTRIC DISTRIBU TION SYSTEM, etc.—Yards & Docks, Nav Dpt., 18 St. and Constitution Ave. N.W Wash. 25, D. C., electric distr. sys. addna $100,000; exten. steam mains, $90,000; re model, exten. inboard end of Pier 90, $130, 000, at Naval Station.

†Wash., Spokane — STORAGE FACILI TIES—Yards & Docks, Navy Dpt., 18 St and Constitution Ave. N.W., Wash. 25, D C., addnl. storage facilities, grading, pavin and exten. tracks and roads providin addnl. open storage area, Naval Supply Depot. $430,000.

†Wash., Tacoma—RAILROAD TRACKAGE—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C. railroad trackage, Advance Base Depot $150,000.

Wash., Union Gap—TRACK REPLACEMENT—Northern Pacific Ry. Co., B. Blum ch. engr., 176 E. 5 St., St. Paul, Minn., replacement 4,788 ft. track, $33,055.

BIDS ASKED

Bids Asked April 5

†Utah, Ogden — SPRINKLER SYSTEM—U. S. Eng., 1209 8 St., Sacramento, Zone 1, Calif., sprinkler sys. in 19 bldgs., at Ogden Air Depot, Spec. 1078.

Bids Asked April 10

†Ia., Mason City—AIRPORT—Civil Aeronautics Admin., City Hall, Kansas City 6, Mo., liming, fertilizing, seeding, mulching and surface rock removal at Municipal Airport, Prop. SP-45-259.

†N. C., Greenville—AIRPORT IMPROVEMENTS—Civil Aeronautics Admin., 84 Marietta St. N.W., Atlanta, Ga., filling washes, constructing berms, repairing fence, constructing addnl. spillways and fertilizing and seeding airport, Prop. 25-295.

†C. Z., Coco Solo—AIR STATION BLDGS.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. Wash. 25, D. C., Engine Test Bldgs. 18 and 25, Naval Air Station, NOY 1938.

Bids Asked April 11

†Pa., Johnstown—AIRPORT—Civil Aeronautics Admin., 385 Madison Ave., New York 17, N. Y., fertilizing and seeding airport, Prop. No. 145-533.

†Ala., Anniston—SIGNAL and ALARM SYSTEM—U. S. Eng., Grant St. west of Westwood St., Mobile, nurses signaling and alarm sys., in hospital area at Fort McClellan.

Bids Asked April 12

†Ala., Montgomery—SIGNAL and ALARM SYSTEMS—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., installing signaling and alarm sys., in hospital area

†Tex., Kelly Field—AUTOMATIC SPRINKLER SYSTEMS—U. S. Eng., Fort Sam Houston, installing automatic sprinkler sys in open sheds Group A, Ser. W-41-154-45-105. CD 3/28.

Bids Asked April 14

†Miss., Biloxi—AUTOMATIC FIRE ALARM SYSTEM—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., automatic fire alarm sys., for hospital and Warehouse area, Keesler Field.

LOW BIDDERS

†Calif., Red Bluff — TUNNEL WORK—U. S. Eng., 1209 8 St., Sacramento, Zone shaft and tunnel work at Iron Canyon damsite, Spec. 1069, from Stolte, Inc., 8451 San Leandro Blvd., Oakland. $55,800.

Calif., San Pedro — SHIPYARD GAS LINES, etc.—Todd Shipyards Corp., Box 231, Mar. 22, installing gas, air, water and steam lines at plant, Spec. 1708, from Associated Piping & Engineering Co., 2332 E. 38 St., Los Angeles, $78,800. CD 3/22—ENR 3/29

†Fla., Jacksonville — AIR STATION BLDGS.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C. Mar. 16, scrap salvage bldg., and yard facilities, Air Station, NOY 8419, from B. B. McCormick & Sons, Jacksonville Beach, $126,454. CD 3/7.

LASSIFIED (Low Bidders, Cont'd.)

d., **Patuxent River (br. Wash. D. C.)**—STATION BLDGS.—Yards & Docks, Dpt., 18 St. and Constitution Ave. Wash. 25, D. C., Mar. 28, boat dock cks and mess hall, addnl. facilities, l Air Station, Webster Field, NOY 11374 A. P. Miller 3333 Arctic Ave., Atlantic N. J., **$278,500.** CD 3/21.

nn., **Memphis**—AIRPORT IMPROVE- TS—Civil Aeronautics Admin., 84 Mari- St., N.W., Atlanta 3, Ga., Mar. 27, l. airport imprvs., Prop. 25-284, from an-Roberts Co., Inc., 575 N. Front St., 641. CD 3/20.

TRACTS AWARDED

la., **Maxwell Field (Montgomery)**—GAR—U. S. Eng., Grant St. west of wood St., Mobile, addnl. tile hangar, outside utilities, to Bear Lumber Co., Lee St., Montgomery, **$129,725.** CD 2/27 NR 3/1.

Calif., **Moffett Field**—FIELD IMPROVEMENTS—Yards & Docks, Navy 18 St. and Constitution Ave. N.W., h. 25, D. C., imprv. flying field and ities to support HTA operations at l Air Station, Spec. 16077, NOY 11794, Haas Constr. Co. and Peter Kiewit Sons 336 Merchants Exchange Bldg., San cisco, **$510,254.** CD 3/27, under LB.

Calif., **Moffett Field**—WIND TUNNEL—ional Advisory Com. for Aeronautics, es Aeronautical Laboratory, Moffett d. 2 wing laboratory addn., connected 7x10 ft. Wind Tunnel 1, to Carl N. nson Co., 355 Stockton Ave., San Jose, 300. Bids 3/20.

Calif., **San Diego** — AVIATION STOREHOUSES — Yards & Docks, Navy 18 St. and Constitution Ave. N.W., h. 25, D. C., addnl. aviation storehouses, Spanish Bight, Spec. 14903, NOY 10496, M. H. Golden, 3485 Noeil St., **$3,219,475.** s 3/14. CD 2/22, under LB.

alif., **San Diego**—CAMP—City-County p Comn., 252 Civic Center Bldg., rehabil- ion camp in Cuyamaca State Park, to I. Johnson, 5025 Catoctin Dr. **$38,770.**

La., **Kenner**—INSTRUMENT LANDING STEM—Civil Aeronautics Admin., 84 rietta St. N.W., Atlanta 3, Ga., instru- nt landing sys., for Moisant Airport, j. 25-270, to McDonough Constr. Co., ers, New Orleans, **$30,989.**

issouri—TRANSMISSION LINES—Macon ctric Cooperative, Macon, 80.3 mi. trans- sion lines, to Henry W. Miller Constr. 415 S. 18 St., Omaha, Neb., **$78,527.** s 2/15. CD 6/2—ENR 6/6.

N. J., **Camp Kilmer**—LOADING and UN- ADING FACILITIES—Yards & Docks, y Dpt., 18 St. and Constitution Ave. ., Wash. 25, D. C., patient loading and oading facilities to Andrew Gull Corp., Porter Ave., Brooklyn 22, N. Y., **$56,198.**

. J., **Ocean Grove** — BOARDWALK — n Meeting Com., Ocean Grove Audi- ium, Ocean Grove, reconstructing board- k and frame stand bldgs., on shore nt, to Ehret-Day Corp., 601 Mattison ., Asbury Park, **$30,000.**

. J., **Sea Girt**—BOARDWALK—Boro of Girt, Boro Hall, reconstructing board- k, to Arthur Venneri Constr. Co., 259 Broad St., Elizabeth, **$27,727.** C. Birdsall, 0 F St., South Belmar, engr. CD 3/13—R 3/15.

Wash., **Bremerton**—TELEPHONE FAC- TIES—Yards & Docks, Navy Dpt., 18 and Constitution Ave. N.W., Wash. 25, C., addnl. telephone facilities, Puget nd Navy Yard, to Automatic Electric es Corp., 1033 West Van Buren St., Chi- o. Ill., **$54,919.**

ash., **Seattle**—PIER ALTERATIONS—rthern Pacific Ry. Co., B. Blum, ch. engr., E. 5 St., St. Paul 1, Minn., altering Pier to Manson Constr. & Engrg. Co., 821 skan Way, Zone 4. Est. **$28,000.**

exas—RURAL ELECTRIC LINES—North ins Electric Cooperative, Inc., Perryton, .78 mi. rural electric lines, Ochiltree Co., Sisco Elec. Co., 200 Chambers St., Conroe, 6,052. C. C. Cox, 619 Oliver-Eagle Bldg., arillo, engr. CD 6/16—ENR 6/22.

Tex., **McGregor**—RAMP WORK—U. S. ., 25 St. and Avenue F, Galveston, ramp k, at Bluebonnet Ordnance Plant, force- ount, **$25,000.**

Va., **Norfolk** — SPRINKLER SYSTEM — rds & Docks, Navy Dpt., 18 St. and Con- ution Ave. N.W., Wash. 25, D. C., install- sprinkler sys., Navy Yard, NOY 11314, Globe Automatic Sprinkler Co., 302 Hearn g., 105 E. Pleasant St., Baltimore 2, Md., 6,668.

. S., **Halifax**—TRAILS, etc.—Province of a Scotia, Halifax, trails, camp sites, fire ces and developing winter playgrounds in vincial Parks, day labor. **$200,000.** Dpt. ds & Forests, Halifax, engrs.

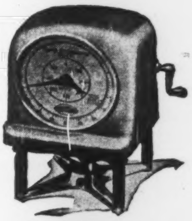
Ont., **Toronto**—GREENHOUSES—L. Lung, Elizabeth St., 5 steam-heated green- ses at Hop Sing Farm, Trafalgar Twp., C. W. James Constr. Co., Ltd., 613 Spadina ., about **$45,000.**

posal Advertisements see p. 356 & 357
Postwar Projects see p. 264

"NO TROUBLE WHATEVER IN PRODUCING 1100 TONS PER 10 HR. SHIFT

with our H & B ASPHALT PLANT"

says W. W. King, of King Paving Company, Ltd.



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OFFICIAL PROPOSALS

Bids: April 10 (369)

Water Supply Line

CITY OF BETHLEHEM

Construction of Water Supply Line with Appurtenances from East Third Street Northwardly across private property, the Lehigh River and through streets of the City of Bethlehem to the intersection of Dewberry Avenue and North Main Street and connecting into the existing water main system at designated points.

Sealed Proposals will be received by the City of Bethlehem at 53 East Broad Street, Bethlehem, Pennsylvania, until 9:30 A. M., Eastern War Time, on the 10th day of April, 1945, for "Construction of Water Supply Line with Appurtenances from East Third Street Northwardly across private property, the Lehigh River and through streets of the City of Bethlehem to the intersection of Dewberry Avenue and North Main Street and connecting into the existing water main system at designated points" at which time and place they will be publicly opened and read.

Copies of plans, specifications and other contract documents are on file and open to public inspection in the office of R. L. Fox, City Engineer, at 37 East Broad Street, Bethlehem, Pennsylvania, and sets of such documents may be obtained from said office upon deposit of Twenty Dollars for each set. If the documents are returned in good condition within thirty days after the opening of bids, the full amount of the deposit will be returned to each bidder. If the documents are not returned within the time stated, the entire amount of deposit will be forfeited.

The character and amount of bid security to be furnished by bidders is stated in the Instructions to Bidders.

No bid may be withdrawn for (30) days after the scheduled closing time for receipt of bids.

The City of Bethlehem reserves the right to waive any informalities in or to reject any or all bids.

CITY OF BETHLEHEM,
PENNSYLVANIA
BERTRAM L. NAGLE
CITY CLERK

Bids: April 11 (367)

State Highway Work

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Chapter 63 Laws of 1936, as amended, and special provisions for projects financed with federal funds, sealed proposals will be received until one o'clock P.M., Eastern War Time, which is twelve o'clo noon, Eastern Standard Time, on the 11 day of APRIL, 1945, by Henry A. Cohe Director, Bureau of Contracts & Accoun 14th Floor, State Office Bldg., Albany, N. Y. for the reconstruction of the following pro ect in CHAUTAUQUA COUNTY.

Contract No.	Name of highway and miles	Type	Deposit for plans	Bid deposit	Pr
F.A.R.C. 45-5	Penn. State Line-Westfield S.H. 5703 Penn. State Line-Westfield Pt. 1 S.H. 8031 Penn. State Line-Westfield Pt. 2 S.H. 8044 Westfield Village-Main Street S.H. 5663 Westfield-Brocton S. H. 8032 Brocton Village-Main Street S.H. 8033 Brocton-Fredonia S.H. 8008 Fredonia Village-West Main Street S.H. 5664 Fredonia-Silver Creek Parts 1 & 2, S.H. 5262 & 8003 28.61 miles	Bit. Mac. M.M.Opt.	$5	$45,000	

Maps, plans, specifications, and estimate may be obtained at the office of the Depart ment of Public Works, Bureau of Contract & Accounts, Albany, N. Y., and at the offic of the District Engineer, C. R. Waters, Stat Office Building, Buffalo, N. Y., and may b seen at the office of the State Departmen of Public Works, State Office Building Room 898, Worth and Center Streets, New York City.

The deposit for Plans and Proposal Form for each contract containing 1 to 15 sheet is $5.00; 16 to 30 sheets, $10.00; over 3 sheets, $20.00. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specifications, and contract agreement, and to the special provisions applying to projects financed with federal funds.

Proposal for this contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. The proposal must be accompanied by cash draft or certified check payable to the order of "State of New York, Commissioner of Taxation & Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

Minimum Wage Rate per hour for above work shall be as follows:

County	Skilled Labor	Intermediate Grade Labor	Unskilled Labor
Chautauqua	$.85	$.85	$.85

UNLESS SHOWN OTHERWISE IN THE ITEMIZED PROPOSAL FOR THIS PROJECT.

The right is reserved to reject any or all bids.

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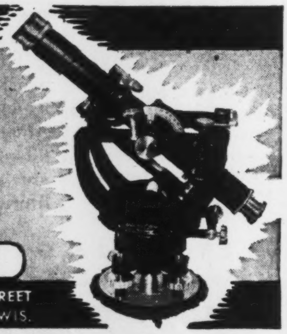

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